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TENTH ANNUAL REPORT
OF
DIVISION OF WATERWAYS
OF
THE DEPARTMENT OF PURCHASES
AND CONSTRUCTION

July 1, 1926
TO
June 30, 1927



LESLIE SMALL, Director
WILLIAM F. MULVIHILL, Superintendent of Waterways
M. G. BARNES, Chief Engineer
L. D. CORNISH, Asst. Chief Engineer

Chicago Office, 220 S. State St.

[Reprinted from the Tenth Administrative Report. Printed by authority
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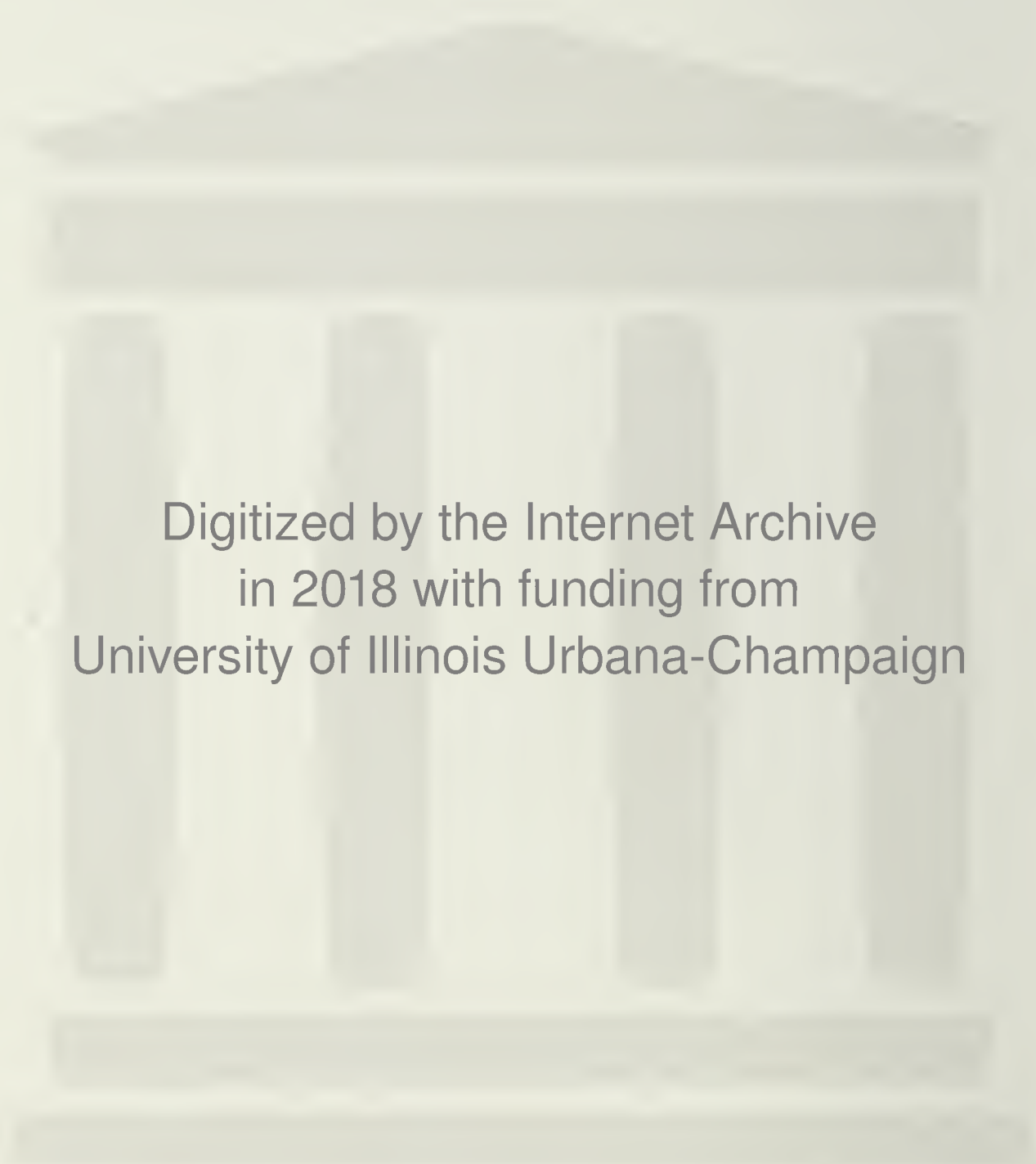
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TABLE OF CONTENTS

	PAGE.
EXTENT OF JURISDICTION.....	5
CALUMET HARBOR SITUATION.....	8
Facts Regarding Proposed Ordinance.....	9
Historical Background	9
Law in Force July 1, 1921.....	10
Objection to Nickel-Plate Ordinance.....	11
Commercial Clubs Oppose Ordinance.....	12
Alternative Plans Suggested.....	13
Benefits of Proposal Explained.....	14
CALUMET HARBOR ACT REPEALED.....	15
CHICAGO RIVER STRAIGHTENING PERMIT.....	16
State Sought Provision for Water Terminals.....	18
Mayor Offers Barge Landing Under Wacker Drive.....	20
Permit Issued with Reservations.....	21
Text of Special Stipulation.....	22
COMPLETION OF LOCKPORT LOCK.....	24
FLOODS IN ILLINOIS.....	24
Duration and Causes.....	24-25
Population	25
Loss and Damage.....	26
Beardstown Sea Wall.....	28
Flood Relief Plans.....	28
THE FLOOD RELIEF LAW.....	30
ATTORNEY GENERAL'S OPINION RE SAME.....	30-35
LAKE LEVEL LITIGATION.....	35
Data Compiled in Chicago Office.....	36
Controversial Points Involved.....	36
"CHICAGO BUSINESS VIEWS WATERWAY".....	37-43
("A University Course in Waterway Economies.")	
ILLINOIS & MICHIGAN CANAL AMENDMENT.....	43
ENGINEERING REPORT	44-4
The Illinois Waterway.....	49
Illinois & Michigan Canal.....	51
Miscellaneous	52
PERMITS ISSUED	52
EXCESSIVE RAINS IN ILLINOIS VALLEY.....	52
Tabulation of Rainfall.....	53
Drainage Districts Embrace 1,550,000 Acres.....	55
ILLINOIS AND MICHIGAN CANAL REPORT.....	56
PUBLICATIONS FOR DISTRIBUTION.....	58



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WATERWAYS.

WM. F. MULVIHILL,
Supervisor of Illinois Waterway Construction.

This report, being the Tenth Annual Report of the Division of Waterways, covers in outline the work of the division from July 1, 1926, to June 30, 1927.

Under an amendment to the Administrative Code, effective July 1, 1925, the Division of Waterways was transferred from the Department of Public Works and Buildings and became a part of the newly created Department of Purchases and Construction.

EXTENT OF JURISDICTION OF THE DIVISION OF WATERWAYS.

The law confers upon the department the powers, duties and jurisdiction formerly exercised by the Rivers and Lakes Commission, with especial reference to its jurisdiction over all rivers and lakes of the State of Illinois, to prevent pollution thereof or encroachments thereon; the powers and duties of the Illinois Waterway Commission, with reference to the construction, operation and maintenance of the Illinois Waterway, and for the development and utilization of the water power thereof; and also the powers of the Illinois and Michigan Canal Commissioners, for the control and management of the Illinois and Michigan Canal, the maintenance of the navigability thereof and the sale and lease of canal lands and property.

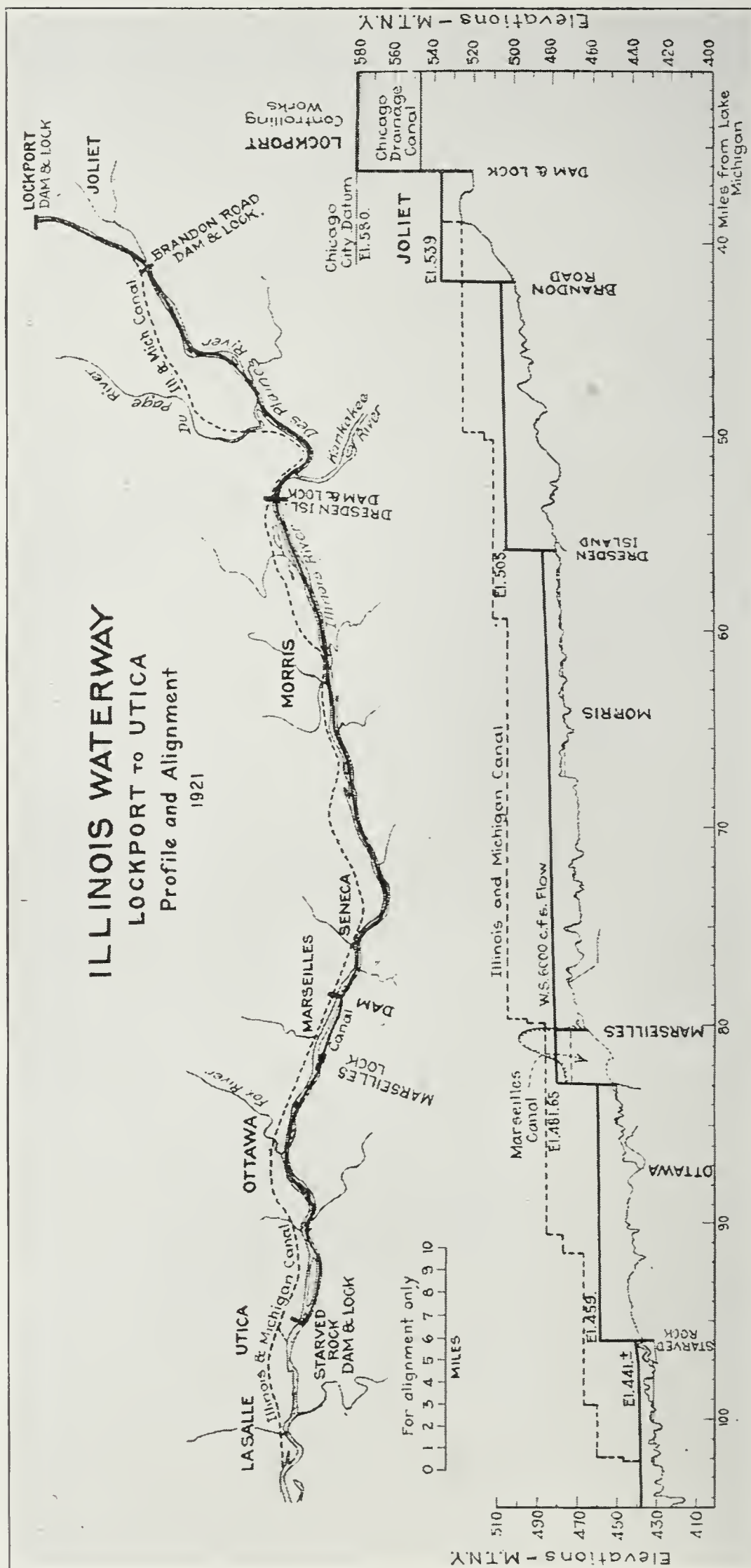
A YEAR OF STRENUOUS WORK.

The fiscal year ending June 30, 1927, was a strenuous one for the Division of Waterways. Although excessive rainfall and adverse weather conditions tended to slow up the construction work of the division, many controversial questions were disposed of and plans worked out for completing the Illinois Waterway in the shortest possible time consistent with economical and satisfactory construction.

Among the many important matters claiming the attention of the division the following are noted here, although some of them will be discussed at greater length in the body of this report:

CHICAGO NICKEL-PLATE—CALUMET LAKE ORDINANCE.

1. Consideration and rejection of application for approval of the so-called Nickel-Plate Calumet Lake contract ordinance on the grounds set forth in a communication to Hon. A. A. Sprague, Commissioner of Public Works, appointed by Mayor Dever, in which seventeen reasons why the permit requested should not issue are detailed. Following this action by the division, the General Assembly repealed the Calumet Harbor Act of 1921, under which the Nickel-Plate ordinance had been



Showing deep waterway now under construction by State of Illinois. Five locks, 110 x 600 feet. With present flow from Lake Michigan, minimum depth in earth will be 9 feet and in rock 11 feet, with 14 feet on miter sills.

passed by the Chicago City Council, and an amendment to the Cities and Villages Act was adopted enlarging the powers of the City of Chicago and other municipalities and providing for the levy of a special tax for purposes of harbor construction.

CHICAGO RIVER STRAIGHTENING PERMIT.

2. As a result of protest of the division, made to Mayor William E. Dever regarding the failure of the city to provide downtown terminal facilities for water-borne traffic in connection with the straightening of the South Branch of the Chicago River, the division finally secured a reservation of space under Wacker Drive for water terminal facilities. While this provision is deemed wholly inadequate and of little value, it was accepted as the best concession obtainable in connection with the issuance of a permit for the proposed river straightening.

3. Completion of contract for construction of Illinois Waterway lock, No. 1 at Lockport, by Green & Sons Company of Chicago.

4. Construction of Illinois and Michigan Canal bridge at Columbus Street, Ottawa.

5. Cancellation of permit for pile bridge over Bubbly Creek at Pershing Road, Chicago, for reported violation of terms thereof.

6. Attendance and participation in waterway conventions of Mississippi Valley Association at St. Louis, November 22-23, and National Rivers and Harbors Congress at Washington, December 8-9.

AIDED DEFENSE IN DIVERSION SUIT IN U. S. COURT.

7. Cooperation with engineers and attorneys of Sanitary District of Chicago and Attorney General of Illinois in preparation and presentation of evidence for the defense in the hearings before Charles Evans Hughes as Special Master for the Supreme Court of the United States in the water diversion litigation of Wisconsin, et al. vs. the State of Illinois, et al.

8. Visitation of Beardstown, Cairo, and other flooded areas and recommending plans for flood relief and protection, including needed legislation.

FLOOD RELIEF ACTIVITIES.

9. Attendance upon the Peoria flood control conference and sessions of the Chicago Flood Control Commission; the preparation of questionnaires and securing of data dealing with extent and damage to Illinois lands and property from floods in Illinois and Mississippi valleys in 1926 and 1927.

10. Securing air-photos of Illinois Valley floods 1926-1927 and data for emergency flood relief legislation.

11. Preparation of Emergency Flood Relief bill, for enactment by Illinois General Assembly.

12. Attendance upon sessions of Fifty-fifth General Assembly which convened January 5, 1927, and adjourned June 30, 1927.

13. Negotiating settlements with owners of lands needed for waterway purposes in the DesPlaines and Illinois valleys.

14. Cooperation with city authorities and civic organizations of Beardstown in securing contributions from Baltimore and Ohio, and Chicago, Burlington & Quincy railroads to supplement legislative appropriations to provide sea wall and levees protecting said city from flood waters of the Illinois River.

“CALUMET HARBOR AND THE NICKEL PLATE ORDINANCE.”

An Address, March 1, 1927, before
The South End Chamber of Commerce, Chicago.

By Wm. F. Mulvihill, Superintendent of Waterways.

The invitation to address you tonight on the subject of Calumet Harbor did not indicate the exact purpose, or points, which I should discuss. Permit me therefore to express the hope that if I do not come at once to the consideration of those things which are in your minds most important that you will bear with me, with all patience, while I talk about some things which I consider as of great importance, but which may not at present seem so important to you.

In the first place, let me say that I am deeply interested, as a citizen of Chicago and as Superintendent of Waterways of the State of Illinois, in the development of proper port and harbor facilities in Chicago to meet the anticipated needs of water-borne commerce when the Lakes-to-the-Gulf Waterway shall have been completed and the dream of a deep water connection with the Atlantic ocean shall have been realized.

LAKES-TO-GULF NAVIGATION.

The completion of a 9-foot navigable channel from Chicago to New Orleans, in my opinion is only a few years off. The State has completed, or has under contract, three of the five great locks and dams necessary to unite the waters of the Chicago drainage canal at Lockport with the Illinois River at Utica, which will overcome a fall of 140 feet in a distance of 65 miles, and give a 9-foot channel 102 miles towards the Mississippi from Lake Michigan. The Calumet River and Calumet-Sag Channel connect Lake Calumet with the main channel of the Chicago Sanitary District thus affording you a direct water route from the Calumet district to the trade and commerce of the Mississippi valley system.

This work of building the Illinois Waterway is under my immediate supervision, and will be pushed to completion as rapidly as possible. We estimate three years as the time necessary to complete our construction work, after the last contract is awarded. We are now negotiating for the remaining lock and dam sites and I confidently expect that within three years from next July the State's share of the Lakes-to-Gulf Waterway will be finished.

Our plans are for a 9-foot channel, but improvement of the lower Illinois and Mississippi rivers is under Federal jurisdiction.

FEDERAL AID FOR INLAND WATERWAYS.

When I was appointed Superintendent of Waterways, by Governor Small, September 2, 1925, the Federal projects for the Illinois River between Utica and the Mississippi—a distance of 225 miles with a fall of only 28 feet in the entire distance—called for a navigable depth of only 7 feet, and for but 6 feet in the Mississippi between the mouth of the Illinois and St. Louis.

And so it was that my office, with the approval of the Governor, promoted the inclusion of the Illinois River item in the Rivers and Harbors bill recently passed by Congress, which act modifies the former projects so as to provide for a 9-foot channel instead of 7 feet in the Illinois River from Utica to Grafton and authorized an appropriation of \$3,500,000 therefor.

DIVISION OF WATERWAYS AT WASHINGTON.

In passing let me say that the State of Illinois was represented in Washington from January until July last year by Mr. M. G. Barnes, Chief Engineer of my office, who was in almost daily contact with me by wire; and let me further say that a certain gentleman who is claiming to have promoted the action of Congress and the construction work of the Illinois Waterway is strutting about in borrowed plumage—decked out in laurels he has not won and claiming credit not his due.

The fact is that the gentleman referred to has never, up to this hour, appeared before the State Legislature or the Congress of the United States, or before any committee of either the State or Federal governments in aid of the Illinois Waterway or of any movement in behalf of navigation or water-borne commerce.

But the important thing is that the Federal government has taken action to improve the lower Illinois and has directed an engineering report to be made looking to the improvement of the Mississippi to St. Louis and is now improving that river below St. Louis to a 9-foot depth. More than that, the Congress has authorized an appropriation of \$3,500,000 to do the work with, which is exactly in line with my thought as to what the City of Chicago should do towards the development of Calumet Harbor.

FACTS REGARDING NICKEL PLATE ORDINANCE.

Although many of you—perhaps most of you—are acquainted, in a general way, with the Calumet-Lake-Nickel Plate railroad ordinance, there may be some who do not understand its provisions and are unacquainted with the legislative history preceding it or my reasons for declining to recommend its approval by the Director of the State Department of Purchases and Construction of which the Division of Waterways is an integral part.

Let me therefore refresh your memory as to these historical and legal antecedents:

(1) Calumet Lake is a shallow body of water about 3 miles long and $1\frac{1}{4}$ miles wide, with an area of about 2,000 acres. It lies wholly within the City of Chicago. It is connected at the south end, near One Hundred Twenty-ninth Street with Lake Michigan by the Calumet River, which is 6 miles

long and developed by the Federal government to accommodate vessels of 21-foot draft.

STATE OWNED BED OF LAKE CALUMET.

(2) Under the Constitution and laws of the United States, and the compact in the government ordinance of 1787 the title to the bed of Lake Calumet, as of all other navigable water of Illinois, is in the State in trust for the people. In other words, prior to 1921 the State of Illinois owned the lands under Lake Calumet, in fee.

(3) In 1921 the State Legislature passed an act "in relation to the construction of a deep water harbor in Lake Calumet" and granting the title to certain submerged lands to the City of Chicago—subject to certain conditions. This act authorized the reduction of the area of the lake from 2,000 acres to 500 acres but provided for a depth of about 22 feet of water, so that the total volume of water would be very nearly the same as before.

TITLE TRANSFERRED TO CITY ON CONDITION.

(4) The law also provided for the transfer to the City of the State's title to the bed of the lake, except the reserved water area, and that the acceptance by the city of the grant of lands should obligate the city to build a harbor according to plans to be prepared by the city and approved by the Director of the State Department having jurisdiction.

(5) The city was authorized to sell, convey or lease these lands, with a proviso that before same shall become effective it shall be approved in writing by the Director and the seal of the State department affixed. The law also provides for the creation of a harbor fund consisting of all moneys received from the sale or lease of such lands and to be used only for the purpose provided in the act.

(6) There was also a provision authorizing the Sanitary District of Chicago to build the harbor and to take title to the lands in lieu of the city, under certain conditions.

LAW IN FORCE JULY 1, 1921.

(7) This law which became effective July 1, 1921, had been before the legislature at several sessions and had been killed by vetos or threats of veto by three Governors—Dunne, Deneen and Lowden—previous to Governor Small's approval of it in 1921, after the Attorney General had held it to be constitutional.

(8) June 3, 1922, the Chicago city council voted to accept the grant of State lands, authorized by the statute, and thus obligated the city to construct the harbor according to a plan to be submitted to and approved by the State.

(9) July 13, 1922, C. R. Francis, then Commissioner of Public Works submitted for the city, a tentative plan, which was approved, as stated in the permit, to enable the city to protect its rights in certain pending boundary disputes and to enable the city to prepare a plan for financing the project. It was expressly stipulated that "detailed plans and estimated cost of construction" should be submitted; that land areas should be reduced and water areas enlarged; that the number of slips should be increased and that the beginning of the work should start at the south end of the lake and proceed northward in such units as would permit modification to give better water and rail connections if deemed desirable.

CONDITIONS OF STATE PERMIT DISREGARDED.

(10) None of these conditions were observed by the city—up to September 28, 1925, upon which date the Nickel Plate ordinance was submitted to me for approval by the Director of the department in behalf of the State.

(11) I turned the request over to my engineer department for report. Then it was I first learned that the city had not provided us with the information necessary to an intelligent decision as to whether or not the plan proposed was in harmony with the law and well-calculated to meet the prospective navigation needs intended to be promoted by the State's transfer of title to the lands involved.

(12) Several personal conferences were held with city officials but since the city had failed and continued to fail, to furnish information esteemed necessary, our office was forced to make its own independent investigation of the entire subject, so I was unable to give my answer until January 8, 1926, when I informed A. A. Sprague, the present Commissioner of Public Works, that I could not recommend to the Director the approval of the ordinances and transfer of the land titles; and indicated seventeen reasons therefor.

OBJECTIONS TO NICKEL-PLATE ORDINANCE.

Summarized my objections to the City-Nickel Plate ordinance, more fully stated in my letter of January 8, 1926, are:

1. It provides for an immense railroad yard for the Nickel Plate; but for no harbor.
2. No industrial sites would be created under it.
3. The city offers no plan for financing the creation of industrial sites.
4. No docks are provided for; the deep water channel would be 400 feet from shore.
5. It does not comply with the State's provisional permit issued in 1922 and is not the same plan then submitted.
6. It limits the railroad's obligation for dredging to \$600,000 but the dredging to be done by the railroad would cost \$737,000 according to the city's estimate and over \$1,500,000 on the State's estimate.
7. The city being unable to pay the railroad in cash the cost of the work in excess of \$600,000, it would have to pay in land which would give the railroad absolute power to prevent the development of a harbor of any kind.
8. It fixed a price to the railroad of \$2,000 per acre for lands which it would cost the city from \$3,000 to \$4,200 per acre to fill.
9. The boundary line settlement gives the railroad 228 acres as against 284 acres to all other riparian owners combined.
10. The Nickel Plate would get a right-of-way completely surrounding the lake to the exclusion of all other railroads.
11. This Nickel Plate monopoly would probably mean additional switching charges.
12. No information was submitted showing any demand for industrial sites at this location.
13. It is contrary to the spirit of the Van Vlissingen plan, adopted by the City Council in 1921 which contemplated an industrial and commercial harbor, with public ownership or control.
14. The city, though requested to do so, failed to furnish a legal opinion as to the validity of the ordinance, and statute of 1921 and the city's right to favor the railroad over all other riparian owners.
15. The city could not legally grant to the railroad, as a part of its boundary line agreement, lands not adjacent to the boundary lands.
16. It unlawfully sought to deprive the State of supervisory powers created by statute.
17. The Calumet Harbor Act of 1921 authorizes the city to permit the Sanitary District to build the harbor, and allows the latter to create, by special tax an adequate fund to construct the same.

POLITICAL MISREPRESENTATION CHARGED.

In my letter to Commissioner Sprague I stated: "Should you care to discuss the matter further, or to have the original agreements returned, please advise me and I shall arrange accordingly."

I call your attention to the fact that my letter, dated January 8, 1926 and delivered on that date to Commissioner Sprague, remained unacknowledged until March 9, 1926, but in the meantime the Democratic County convention on Sunday, February 7, 1926, as published in a local

paper, made a wholly unjustified attack upon me, as an officer of a State department, charging that refusal of my office to approve the Nickel-Plate ordinance was an "obvious abuse of a power which was obtained from the legislature under conditions savoring of blackmail." The resolutions also declared that "the people of South Chicago with substantial unanimity, indorsed the project because it promised to add wealth to their region."

In view of the resolution adopted by your organization, and by some 12 or 15 other local commercial and civic bodies, asking for the repeal of the Nickel-Plate ordinance, it is perhaps unnecessary for me to defend myself from the charges made for political purposes by the present Democratic City Administration.

NO POLITICS INVOLVED IN ORDINANCE REJECTION.

Let me quote John M. Ewan, Chicago Harbor Commissioner, in his report on the Chicago Dock Problem, of October, 1909, as throwing some light upon the local situation, and as a refutation of the suggestion that the State administration refused approval of the Calumet-Nickel Plate ordinance for political reasons. Mr. Ewan in his report said:

"Railroad ownership of docks affords efficient service, as a rule, for railroad purposes, but railroad-owned docks do not satisfy the needs of a community for facilities for handling traffic not transferred to or from railroad carriers. Where one railroad owns the docks, other railroads are placed at a disadvantage, to the injury of the community at large. Moreover, while railroads encourage connecting ocean traffic, with which rail competition is impossible, they seek to suppress coastwise traffic and inland water transportation. Control of dock facilities is an important aid to the railroads in suppressing competition by water carriers."

TAKES CITY NEARLY A YEAR TO ANSWER LETTER.

On March 9, 1926, one week less than a year ago, Commissioner Sprague and Corporation Counsel Busch wrote me a two page letter, the first paragraph of which reads as follows:

"Referring to your communication dated January 8, 1926, expressing your disapproval of the Lake Calumet-Nickel Plate Railroad ordinance, and indicating seventeen reasons for that disapproval: We have delayed answering in order to thoroughly consider and completely investigate each of the several objections which you have indicated."

This letter failed to answer any of the several objections, but concluded with the following paragraph:

"We are writing you this letter at this time because we feel that you should be apprised of the reasons for the apparent delay in answering your letter of January 8th."

COMMERCIAL CLUBS SEEK ACTION BY CITY.

You will recall from my previous statement that in my letter of January 8, 1926, I suggested to Col. Sprague that if he cared to discuss the matter further or to have me return the original copies of the agreement between the city and the Nickel-Plate Railroad which had been submitted for approval and would advise me of his wishes, I would arrange accordingly.

No request for the return of these documents was made, but on or about September 10th, 1926, a committee representing your organization called upon Mayor Dever and presented resolutions requesting his Honor, the Mayor, to submit the same to the City Council at its next regular meeting on September 15th last, with a request that the council immediately repeal the Nickel Plate ordinance under the State Law of 1921, and requesting further that the City Council prior to January 1, 1927, propose a definite plan for the financing and development of one of Chicago's very greatest commercial and industrial assets, the Calumet Harbor.

A copy of these resolutions was furnished to me and in addition some members of the delegation which waited upon the Mayor, advised me that Mayor Dever had expressed himself as favorable to your petition but was in doubt as to whether or not my office had definitely refused to approve the Nickel Plate ordinance.

Copies of similar resolutions were furnished me as having been adopted by:

1. Roseland Kiwanis Club.
2. Harvey Chamber of Commerce.
3. 119th Street Business Men's Association.
4. 119th Street Commercial Club.
5. North Roseland Improvement Association.
6. West Pullman Lions Club.
7. Kenrose Women's Club.
8. Roseland Lions.
9. South Michigan Avenue Improvement Association.
10. Morgan Park Improvement Association.
11. Garden Homes Improvement Association.
12. 103rd Street Greater Chicago Improvement Association.
13. American Voters' League.
14. Chesterfield Commercial Club.

ORIGINAL DOCUMENTS RETURNED TO CITY.

Acting upon the suggestion of the delegation from your organization, I, on September 13, 1926, returned to the Commissioner of Public Works of the City of Chicago the original signed copies of the proposed contract between the city and the Nickel Plate Railroad with a letter stating the position of this office with regard to the development of a proper harbor in Lake Calumet.

At the time the gentlemen from your organization were in my office, I suggested that if the people of the Calumet region were convinced that the proposed Lake Calumet Nickel Plate ordinance was undesirable and should therefore be repealed, and if the city intended to build the harbor under the State Law of 1921, immediate steps should be taken to finance the project.

ALTERNATIVE PLANS FOR HARBOR SUGGESTED.

I further suggested the desirability of excluding the idea of a harbor belt line completely surrounding the lake and that in lieu thereof railroad connections for all the lands and slips on the west side of the lake be made with the present Pullman Railroad and on the east side of the lake with the Nickel Plate and Chicago and Western Indiana Railroads, both of which connect by existing Belt Lines with all rail-

roads entering Chicago with but a single switching charge, whereas the Harbor Belt would require a double switching charge.

In connection with my letter of January 8, 1926, to the city, attention was called to the fact that terminal railroad facilities were and are available for development of Calumet Harbor without necessity for a Harbor Belt Line and that the existing railroads connect with Trunk Line Railroads both at the north and south end of the lake, which would make it unnecessary to construct a railroad bridge across the entrance to the proposed harbor.

COPIES FURNISHED CITY OFFICIALS.

At that time my office suggested a harbor plan and presented a map, copies of which were furnished to the Mayor and members of the City Council, as a substitute for the Nickel Plate Railroad plan.

If the alternative plan submitted or some modification of it should be adopted the first section of the harbor at the southwest corner of the lake containing about 102 acres and immediately adjacent to the improved channel of the outlet of Calumet Lake could be filled and reclaimed and suitable docks placed in front of the entire tract for a distance of about 4,300 lineal feet, together with the filling for both railroad and highway purposes, as shown on plan, for an estimated cost of about \$743,500.

BENEFITS OF PROPOSAL EXPLAINED.

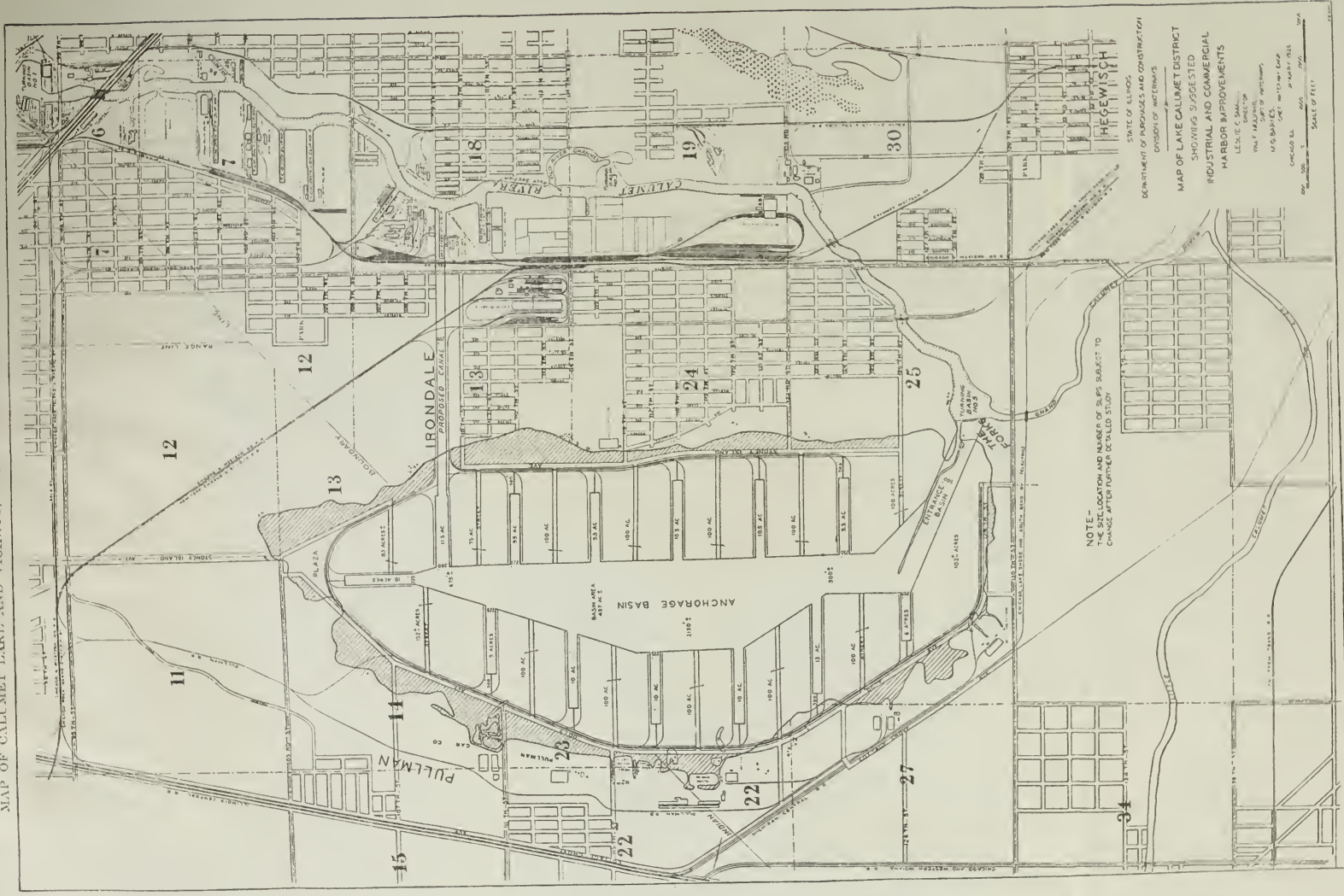
If this plan was adopted, the existing terminal railroads, which now serve lands adjoining this property, could serve the proposed dock property without cost to the city. The cost of filling this 102 acre tract, building the docks and filling in Doty Avenue, from the entrance basin to about 126th Street, would cost nearly \$200,000 less than the city would have to pay under the Nickel Plate ordinance for digging a 200-foot trench up through the middle of the lake. And the city would have available 102 acres of developed harbor lands, provided with suitable docks, ready for immediate occupancy and connected to the present Federal channel with a depth of 22 feet suitable to accommodate all lake traffic.

If the work should be done in sections as thus suggested, it would greatly reduce the length of haul of the excavated material, as compared with the Nickel Plate plan, at an estimated saving of 15 cents per cubic yard. On the basis of the city's estimate of the amount of fill required for this area, the saving would amount to \$328,000. Moreover, the city would have the benefit of the filling for street or highway purposes and would still own the railroad right-of-way which it might lease or sell, if it so desired.

REVOLVING FUND PROPOSED.

I suggested to your committee that as an evidence of the good faith of the city administration, provision should be made for an adequate revolving fund to enable the city, after repeal of the Nickel Plate ordinance, to proceed with the construction of Calumet Harbor along the lines suggested by our office or on some other basis which might be deemed more desirable by yourselves and the city.

MAP OF CALUMET LAKE AND VICINITY, WITH SUGGESTIONS FOR HARBOR DEVELOPMENT.



This Map and Harbor Plan was prepared by the Division of Waterways of the State of Illinois, in 1928, as an alternative to the then pending Nickel Plate Ordinance. The Ordinance provided facilities now available could be utilized. These facilities would have been available with trunk railroads at both ends of the lake, thus making unnecessary a railroad bridge across the entrance to the harbor. This plan would also save the additional switching charge which a "belt line" around the lake would entail.

I suggested three possible plans for consideration by your committee as feasible and practical methods of procedure, as follows:

First, that the City Council include in its 1927 budget an appropriation of not less than \$1,000,000 nor more than \$2,000,000 as a revolving fund for Calumet Harbor Construction.

Second, that if an outright appropriation could not be secured from the Mayor and City Council, a bond issue for not less than \$2,000,000 be submitted to popular vote at the February Aldermanic primary, if possible, and not later than the April election, which if approved would provide funds for your needs, and

Third, that if such bond issue was submitted and not approved, then an appeal could be made to the Legislature now in session and which does not adjourn until the first of July, asking that the Calumet Harbor Act of 1921 be repealed and that a new law be enacted authorizing the creation by vote of the people of a Calumet Harbor District on which should be conferred the same powers, rights and privileges with regard to the ownership lease or sale of Calumet Harbor lands as were sought to be conveyed to the city by the Act of 1921.

I understand that the representatives of your organization have been unable to secure from the present Mayor and City Council any action looking even to the repeal of the Nickel Plate ordinance to say nothing about their making any other provision for the development of your greatly desired harbor.

NO ACTION TAKEN BY CITY.

Sometime after the delivery of the above address at the solicitation of the business interests of Calumet District, and prior to the change in the City Administration, this office agreed to recommend the issuance of a permit for construction of the proposed harbor by the city itself under certain conditions, which were not complied with and all negotiations lapsed.

CALUMET HARBOR ACT REPEALED.

Because it was feared that the Lake Calumet Harbor Act of 1921 was unconstitutional a substitute measure was introduced in the General Assembly by Representative Wm. W. Powers of the Thirteenth Senatorial District at the request of the new City Administration of Chicago.

The proposed House bill, which eliminated all State supervision, was unsatisfactory to the Superintendent of Waterways and died on the Speaker's table.

After discussing the matter with Representatives Powers, Garriott and Schnackenberg and Senator Harry Starr, all of the Thirteenth District, the Superintendent of Waterways, in conference with Corporation Counsel Samuel Ettelson and his assistants, proposed that the desirable features of the Powers bill and of the 1921 Harbor Act, together with certain reservations of State supervision, be added as amendments to Senate Bill 611, then pending, in order that a proper Harbor Act might be enacted without delay.

The new Act gives the city the power to levy a special tax for harbor construction. While it prohibits the sale of harbor lands, it permits the city to lease the same for 50 years, rentals to be based upon a revaluation every ten years.

Originally the amended Senate bill was a so-called "city revenue bill" of no particular significance, but having been passed by the Senate, it afforded a means of establishing the desired basis for harbor construction. The House adopted the agreed amendments, which gave a real meaning to the bill, on the next to the last day of the session and passed the bill as amended about 10 o'clock on the night of adjournment.

Active cooperation between representatives of the city and of the Division of Waterways resulted in the Senate concurring in the House amendments as the last act of that body before midnight. That much credit should be given to Senator Harry W. Starr, Chairman of the Senate Harbor Committee, who secured this action by the Senate, will be conceded, when it is understood that the upper house had killed five bills just before the new Harbor bill was voted upon.

The new law gives the city a free hand with reference to harbor development in Lake Calumet and elsewhere in the city. Under it the city can make an arrangement with the Nickel Plate Railroad if it so desires or it can build a harbor itself without reference to the wishes of any railroad or private interest.

CHICAGO RIVER STRAIGHTENING PERMIT.

The question of straightening the South Branch of the Chicago River, as a means of relieving traffic congestion in the down-town district by providing more through streets, has been discussed in Chicago for many years. When the Union Station ordinance was passed, early in 1914 serious consideration was given this question and a provision included under which the railroads, entering the Union Station and owning property abutting on the river, agreed to cooperate with the city, or any governmental agency, in proceeding to straighten the river and also to abide by the decision of a Board of Arbitration regarding all questions of benefits and damages in connection with such straightening.

The Baltimore and Ohio Chicago Terminal Railroad, which owns a large area of land abutting on the river agreed, through the acceptance of an ordinance passed by the City Council on February 19, 1915, to a provision for river straightening similar to the provision contained in the Union Station ordinance.

In August, 1921, representatives of the railroads appointed a committee to study the question. After several meetings of this committee, certain of the railroads undertook to prepare plans for a new union passenger terminal station, south of the loop district, and for new freight facilities in connection with river straightening.

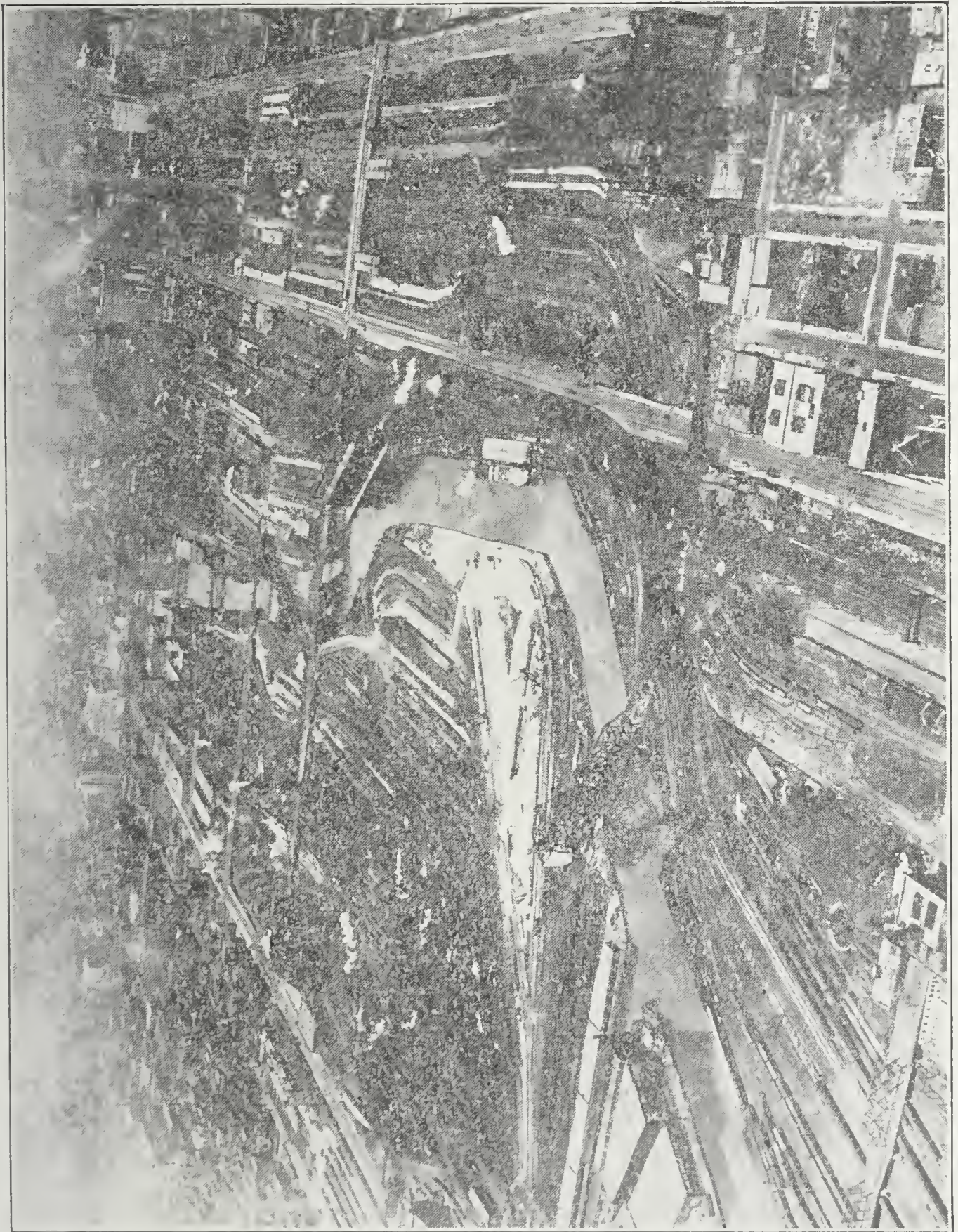
CITIZEN'S COMMITTEE FORMED.

It soon became apparent that river straightening could proceed, without waiting until the character of railroad development should be finally determined, if a satisfactory re-allocation of lands among the several railroads should be agreed upon.

Under these conditions a Citizens Committee consisting of: Silas H. Strawn, James Simpson, Theodore W. Robinson, Arthur G. Leonard,

and William R. Dawes was agreed upon to undertake the work of ironing out the difficulties and speeding up the project.

The project itself was intended not only to provide facilities or benefits to the railroads having terminals south of the loop district,



Airplane view of South Branch of Chicago River, showing how bend interferes with through streets.

but also to open up the whole South Side of Chicago, west of State Street, and the whole West Side from Roosevelt Road to Fifty-ninth Street as well. Dearborn, LaSalle, Wells, Franklin and Canal Streets, now cut off by the bend in the river, will become through avenues of communication north and south. Sixteenth Street and Twenty-second

Street will also be opened across town, affording passage east and west between Roosevelt Road and Thirty-ninth Street.

STATE SOUGHT PROVISION FOR WATER TERMINALS.

While these matters were under consideration, the late William L. Sackett, then Superintendent of Waterways, and M. G. Barnes, Chief Engineer and head of the Division for several months following Mr. Sackett's death, suggested that any plan adopted should provide water terminal facilities to accommodate the downtown commercial interests of Chicago. They urged that, in carrying out the river straightening project and re-allocation of lands to the railroads, provision should be made for a public water terminal for packet freight. These suggestions were based upon the legal proposition that the State owns the bed of all navigable streams in fee, holding the same in trust for the people; and also upon the following statutory provision regarding any change in the location of any such channel:

"The State of Illinois shall take the same title and to the same extent in territory in metes and bounds in and to the channel course or bed of such watercourse or stream after its relocation by the city or village as it had in the channel course or bed of the watercourse or stream before its relocation."

CITY AUTHORITIES FAILED TO REPLY.

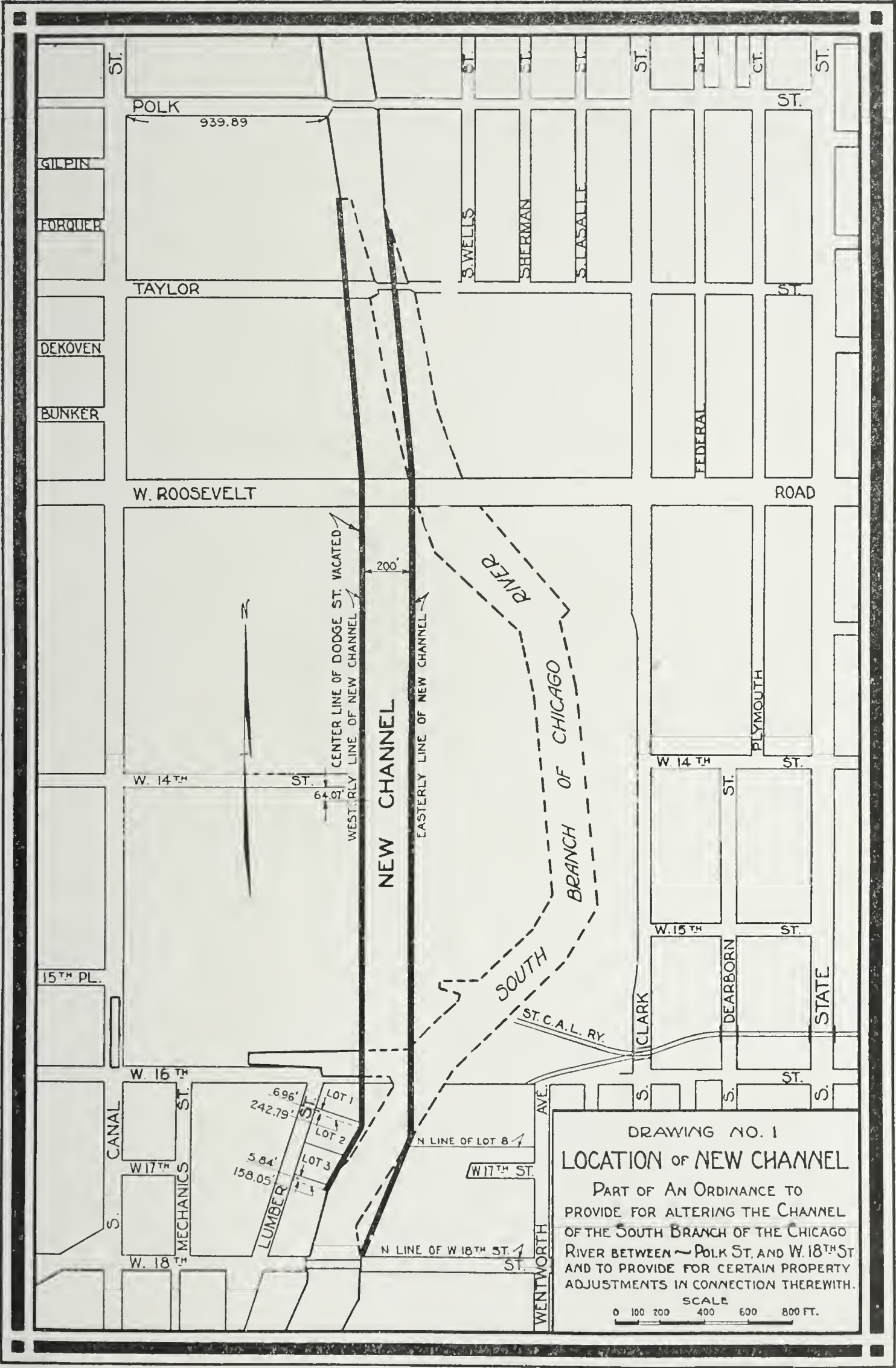
Since it was proposed to make the new river the same width as the old and the distance shorter there would not be the same superficial area, the difference being about 143,370 square feet, it was thought not unjust to require that some provision be made for a water terminal close to the commercial center of the city, whereby the State would receive in terminal area a space corresponding to its lost area in the shortened bed of the river. These requests, addressed to the city authorities, went unanswered.

On July 8, 1926, the Chicago City Council adopted an ordinance entitled "An ordinance to provide for altering the channel of the South Branch of the Chicago River between Polk Street and West Eighteenth Street and to provide for certain property adjustments in connection therewith." (See map herewith.)

ORDINANCE SILENT: MAYOR OFFERS COMPROMISE.

Under date of July 9th the Commissioner of Public Works applied for a permit, to be issued to the City of Chicago or its agent, to proceed with the work covered by the above entitled ordinance, copy of which was furnished on July 14th. The ordinance, a printed book of 218 pages, supplemented by numerous maps and diagrams, did not provide facilities for water-borne commerce suggested in the letters of Messrs. Sackett and Barnes dated April 24, 1924, and July 29, 1925, respectively. This fact was called to the attention of the Mayor.

Under date of July 19, 1926, Mayor Wm. E. Dever, in a letter to the Superintendent of Waterways, acknowledged the failure of the Commissioner of Public Works to answer the letters of Messrs. Sackett and Barnes. He discussed at length the importance to the public of the proposed river straightening and suggested the use of the river



front along the Wacker Drive improvement for water terminal use. Among other representations made by the Mayor were the following:

EXCERPTS FROM MAYOR DEVER'S LETTER.

The Wacker Drive improvement as it has been and is being constructed provides on the lower or dock level for the following marine landing facilities:

1. It has continuous wharfage between Michigan Avenue Bridge and the Lake Street Bridge, a distance of nearly three-quarters of a mile. The actual length of wharfage, deducting bridge abutments, is about 2,725 lineal feet.

2. The dock area for marine landing amounts to 63,690 square feet.

3. The dock level in the east plaza—State Street to Michigan Avenue—provides storage area such as is required in marine transit houses. The total floor space at dock level amounts to 65,400 square feet. There is also storage space available on the dock level between Lake Street and Franklin Street amounting to 6,000 square feet. The total storage area under cover is 71,400 square feet. Total landing area is 63,690 square feet, making a total area for marine landing and storage of 135,090 square feet.

OFFERS BARGE LANDING UNDER WACKER DRIVE.

Transport facilities for serving public barge landing and transit warehouse storage on the low level of Wacker Drive could not be excelled anywhere in the central business district for the following reasons:

1. Continuous wharfage between Lake Street and Michigan Avenue will afford ample room for the docking of barges. There is room for the docking at one time of as many as twenty-four barges 100 feet long, or eighteen barges 120 feet long, or seven barges from 250 to 300 feet long—the latter being the longest barge used on the Mississippi River.

2. There are 63,000 square feet of landing space adjacent to a by-pass thoroughfare around the loop, having a capacity for three lanes of traffic in each direction. This thoroughfare connects with the Chicago and North Western terminals north of the river and east of Michigan Avenue by way of the low level of the Michigan Avenue bridge; with the Illinois Central and Michigan Central freight terminals south of the river and east of Michigan Avenue by way of River Street and South Water Street; with the freight terminal district north of Lake Street on the west side of the river by way of the ramp between Franklin and Lake streets, and with the south side and west side freight districts by way of Franklin to Lake Street ramp and the inclined driveway in Market Street between Lake and Randolph Streets. Connections will also be made for local delivery in the central business district by way of mid-block connections between Michigan Avenue and State Street, State Street and Wabash Avenue, Dearborn Street and Clark Street, and Wells Street and Franklin Street.

“MEETS ALL REQUIREMENTS OF DOWN TOWN SECTION.”

3. There are 14,190 square feet of landing space on a frontage of 540 feet opposite storage space of 65,400 square feet with a continuous free way for trucking between wharfage and storage. It would appear that all requirements for a public barge station for the downtown district are fulfilled in the State Street to Michigan Avenue plaza sector. It should afford ample facilities for local delivery in the loop district.

4. Backing-in space, or loading space, is available along the south line of the street from Michigan Avenue to Lake Street. The depth of the space for the major part of the distance is 45 feet, and there is room for the storage of 300 motor trucks.

5. The construction makes possible provision for marine landing and transit storage on the low level of this improvement, and the designating of

certain parts of the continuous wharfage for public landings, also portions of the covered storage space for public use.

6. The dock level is 135 feet wide and is to be used principally for heavy vehicles—motor trucks—offering a valuable by-pass thoroughfare around the loop, so as to decrease or largely eliminate unnecessary vehicle trucking across the loop, especially from the Illinois Central, Michigan Central, and lake front freight stations.

7. Ten entrances to the low level will ultimately be provided along the improvement, giving splendid access for truck and motor vehicle transit for local district freight delivery in connection with marine landing and storage.

8. In addition to this it is perfectly feasible and possible to make a connection with the Illinois Tunnel Company and thus give to this location direct connection with every railroad entering or leaving the City of Chicago.

I think you will agree that the lower dock level of the Wacker Drive improvement will furnish all the marine landing and storage area which can at the present time be foreseen as necessary to meet the development which is likely to follow completion of the Illinois Waterway project. When that project is completed there surely will be no insuperable difficulty to the establishing by purchase or condemnation of the necessary river frontage such further public docks as may be required.

PERMIT ISSUED WITH RESERVATIONS.

Under date of August 7, 1926, the following communication was sent to Mayor Dever:

STATE OF ILLINOIS

DEPARTMENT OF PURCHASES AND CONSTRUCTION

DIVISION OF WATERWAYS

Wm. F. Mulvihill,
Superintendent
M. G. Barnes,
Chief Engineer

CHICAGO OFFICE
Chicago, Illinois

Leslie Small, Director

August 7, 1926.

Honorable William E. Dever, Mayor,
City Hall,
Chicago, Ill.

My dear Mr. Mayor:

Referring to your letter of July 19th requesting approval of the so-called Chicago River-Straightening Ordinance, passed by the City Council July 8, 1926, in which letter you indicate in detail the available docking and storage space beneath Wacker Drive.

You are advised that upon receiving a favorable report of our Engineering Department; and upon condition that the City of Chicago will reserve for navigation purposes the space indicated in your letter, I have caused to be prepared a formal permit of the State Department of Purchases and Construction, authorizing the changes provided for in said ordinance and have recommended the approval and issuance of such permit by the Honorable Leslie Small, Director of the Department.

Permit me to say that there are certain provisions of the ordinance which do not have the full approval of our engineers and which, in our opinion, might have been modified and improved without added cost or delay, had your department of Public Works submitted the proposed plans to

our office informally, prior to the adoption of the ordinance in final form by the City Council and the adjournment of that body for the summer.

However, in the hope that prompt approval of the River-Straightening Ordinance by the State will lead to an equally prompt acceptance of its terms by the various railroads; and to the end that always there may be the closest cooperation between the municipal and State governments in matters affecting the public interest, we have decided to waive all minor objections and to recommend immediate approval of the ordinance on the conditions indicated above.

Yours very truly,

(Signed) WM. F. MULVIHILL,

.. Superintendent of Waterways.

TEXT OF SPECIAL STIPULATION.

The formal permit of the State of Illinois (No. 1179) issued to the City of Chicago "to alter the channel of the South Branch of the Chicago River between Polk Street and West Eighteenth Street in accordance with an ordinance passed by the City Council of the City of Chicago, July 8, 1926, and in accordance with plans filed with the Department of Purchases and Construction," contains the following special stipulation:

"The City of Chicago shall reserve for navigation terminal purposes the space on the dock level of its Wacker Drive improvement, as specifically set forth and described in a letter addressed to the Superintendent of Waterways, dated July 19, 1926, and signed by Wm. E. Dever, Mayor, and shall not lease any of the said reserved terminal area for other than navigation purposes without the consent in writing of the State of Illinois, acting by and through its Department of Purchases and Construction, or other proper agency."

CITY ACCEPTS CONDITIONAL PERMIT.

Under date of August 19, 1926, the City of Chicago by its proper officials thereto duly authorized, accepted the permit subject to all the conditions named therein.

The following letter is self-explanatory:

(Seal)

Office of the Mayor
CITY OF CHICAGO

WILLIAM E. DEVER
Mayor

August 19, 1926.

Mr. William F. Mulvihill,
Superintendent of Waterways,
Department of Purchases and Construction,
Chicago, Illinois.

Dear Mr. Mulvihill:

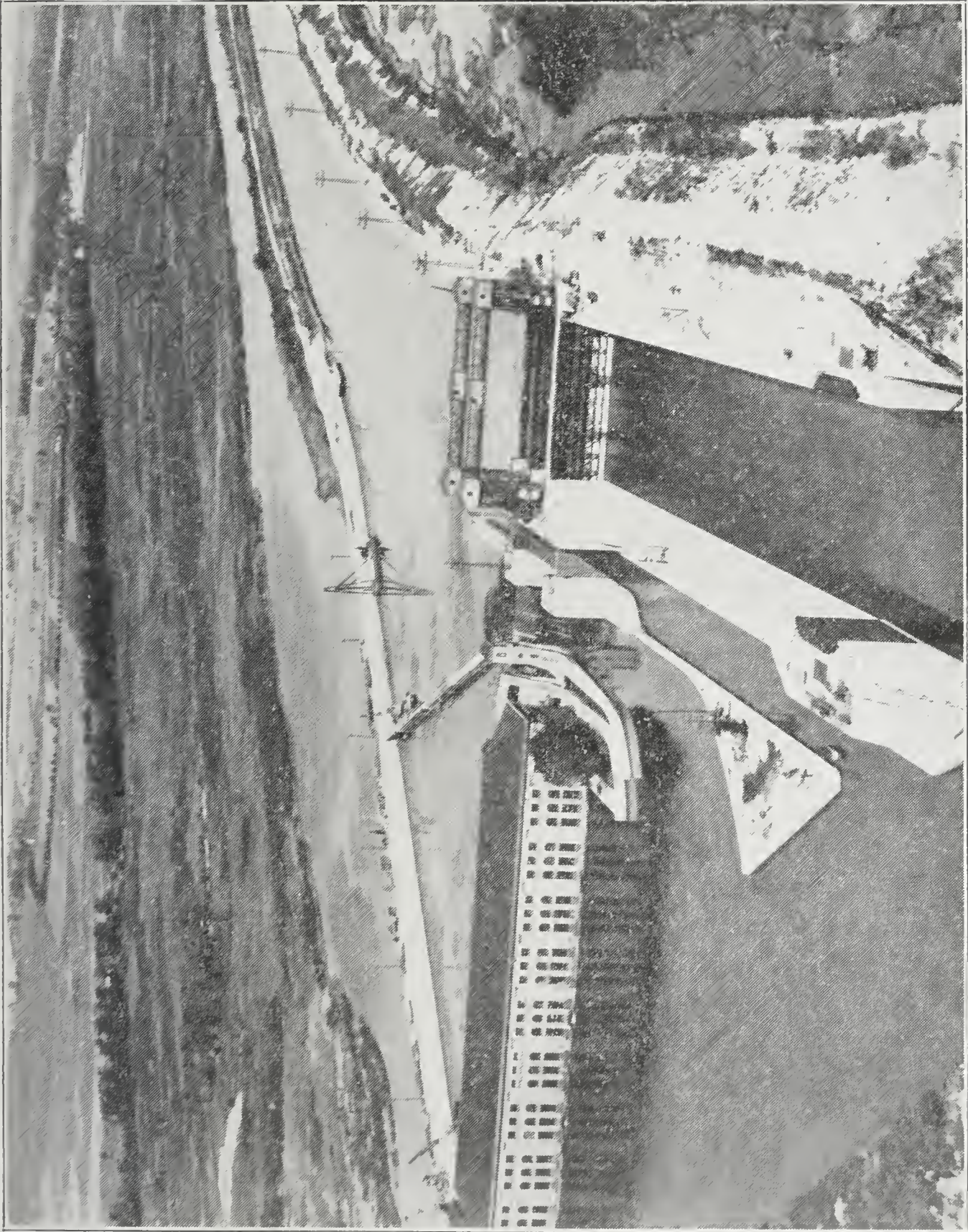
I return herewith Acceptance Blank which was attached to the permit issued by the Department of Purchases and Construction for the proposed straightening of the Chicago River between Polk Street and West Eighteenth Street, in accordance with an ordinance passed by the City Council, July 8, 1926, properly executed by the duly authorized city officials.

Again expressing my appreciation to you for your promptness in co-operating with us in this most important undertaking, I am

Very truly yours,

(Signed) WILLIAM E. DEVER,
Mayor."

(Received Aug. 23, 1926, Division of Waterways, Wm. F. Mulvihill, Superintendent.)



Airplane view of Lockport Lock, No. 1 in the 5 of the Lockport-Utica series of the Illinois Waterway. This lock, like all others of the Waterway, is 110 feet wide and has a usable length of 600 feet with 14 feet of water over the miter sills. It connects the Chicago Sanitary and Ship Canal, which has the same water level as Lake Michigan, with the DesPlaines River 41 feet below. It is 35 miles from Chicago. The old Illinois and Michigan Canal lock is seen to the immediate left of the new lock. Power house at extreme left.

COMPLETION OF LOCK NO. 1.

Lock No. 1 of the Illinois Waterway is located at Lockport about 35 miles from Lake Michigan at the west end of the main channel of the Chicago Sanitary and Ship Canal. This lock is supplied with water from the Chicago Sanitary District Channel and discharges into the DesPlaines River. Like the four other locks of the series between Lockport and Utica, Lock No. 1 has a usable length of 600 feet. It is 110 feet wide with a depth of 14 feet of water at all times. There is a difference of 41 feet between the water levels of the pools connected by this gigantic lock.

This lock is equipped at the upper end with two sets of gates of the submersible type, each weighing 200 tons, the erection of which was included in the general contract for the construction of the concrete walls of the lock chamber.

On October 8, 1923, the contract for construction of this lock, including the upper gates, was awarded to Green & Sons Company, Tower Building, Chicago, the low bidder, at the bid price of \$1,460,076.50. Work started immediately, with substantially the same organization that had previously built the Marseilles Lock. The work covered by this contract was completed during this fiscal year at a cost of \$1,353,907.83 being \$106,168.67 under the contract price.

The gates at the lower end of the Lockport Lock are of the swinging type, each gate being 55 feet wide and nearly 65 feet high. They weigh 315 tons each. The contract for the lower gates of this lock were included with the contract for erection of both the upper and the lower lock gates of the Marseilles Lock.

FLOODS IN ILLINOIS.

Floods in the State of Illinois are not uncommon. Since 1879 there have been more than a dozen floods in the Illinois Valley. Floods causing excessive property damage occurred on the Illinois and Mississippi and their tributaries in Illinois in 1922, 1926 and 1927.

The extent of floods causing damage in 1926-1927 was as follows: Illinois River from Peoria to Grafton, Sangamon River from Springfield to its mouth, Mississippi River from East St. Louis to Cairo.

DURATION OF FLOODS.

The 1926 flood on the Sangamon and Illinois rivers occurred during the crop season and exceeded all prior floods as to flood heights and damage to property. It continued for a period of 42 days on the Sangamon River and for 66 days on the Illinois River.

The 1927 flood followed close upon the flood of 1926 and continued for a period of 109 days on the Sangamon River and for 151 days on the Illinois River, for 33 days on the Mississippi River at East St. Louis and for 75 days at Cairo.

DEPTH OF WATER ON FLOODED LAND.

The depth of water on drainage and levee district land in some cases was as great as 15 feet. In the city of Beardstown on the Illinois

River, 80 per cent of the city was submerged up to a maximum of about 12 feet.

The 1922 flood on the Illinois River had set the highest record since 1844, but new records were established by the 1926 flood. The 1927 flood was practically the same in flood heights as was the 1922 flood.

CAUSES OF FLOODS.

The cause of these floods was excessive rain fall upon the head waters of the streams concerned, which in the case of the Illinois River was unusually excessive for such a small area. The volume of flood waters according to government records was not greatly in excess of previous floods but the construction of levees for the reclamation of overflowed areas had greatly reduced the flood flow section of the rivers which resulted in unusual flood heights for the volume of water discharged. The effect of levees and channel control work also affected to some extent the flood heights on the Mississippi River from East St. Louis to Cairo.

THE CHARACTER OF AREAS FLOODED.

The principal areas flooded consisted of farm lands which had been reclaimed by levees. These reclaimed lands were very productive. When first put in cultivation the crop is confined almost entirely of corn, the yield being from 80 to 100 bushels per acre. In the course of perhaps 10 years, the yield is reduced to about 60 bushels of corn per acre. The yield of wheat ordinarily runs from 30 to 40 bushels per acre.

TOWNS AND CITIES FLOODED.

The cities of East Peoria, Naples, Beardstown and Mounds were the ones which suffered the greatest damage from these floods. Other municipalities wholly or partly under water were Liverpool, Browning, Frederick, Meredosia and Valley City.

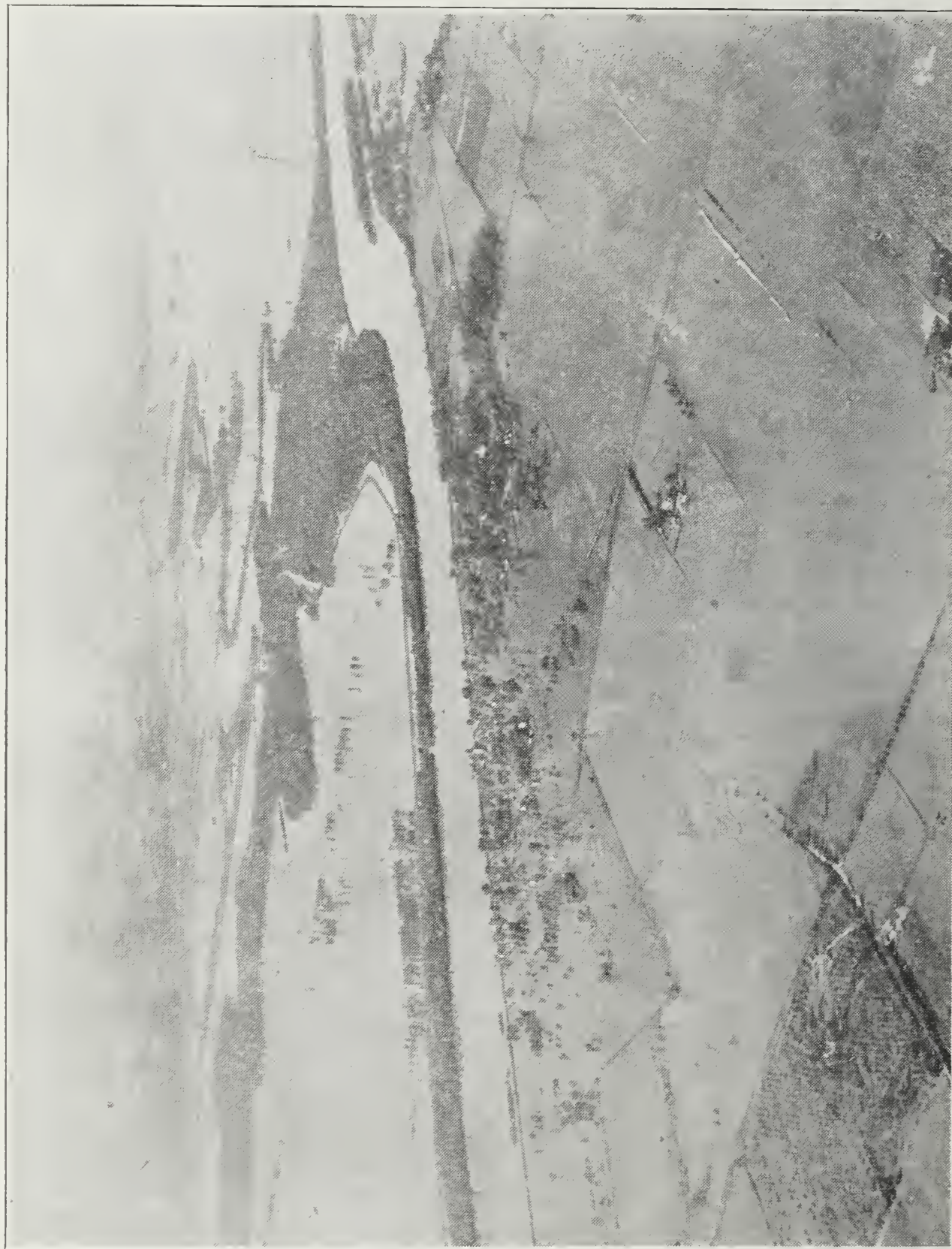
POPULATION.

The population of the flooded areas in Illinois was almost entirely white except in the vicinity of Cairo. In Beardstown the workers residing in the suburbs were compelled to leave their homes, but in Mounds more than one-half of the population were compelled to leave the city for a period of four weeks during the 1927 flood. Those that were forced to evacuate were cared for in other houses and tents on higher ground. There were no lives lost and but few people were injured, none of them seriously. There was no reported increase of sickness which could be attributed to the floods, except at Mounds where a severe out-break of typhoid fever occurred due to flood waters carrying contents of cesspools throughout the city.

AFFECT ON MORALE OF THE PEOPLE.

In the cities of Beardstown and Mounds, which were inundated and also in the city of Cairo, which was saved from destruction by water only through the heroic and efficient work of its citizens, the effect of the floods on the morale of the people was a marked demon-

stration of the fighting spirit of the American pioneer. Everybody turned out and fought the floods so long as there was any possibility of protecting their community and after they were beaten the people exhibited great cheerfulness. Although Beardstown was under water for



The village of Naples and surrounding farm lands flooded by overflow of the Illinois River.

several weeks in the fall of 1926 and the spring of 1927, business was not suspended. The people got about in row boats or hip high rubber boots.

LOSS AND DAMAGE.

The volume and activity of business in the flooded towns and cities of Illinois is closely related to the prosperity of the agricultural districts which they serve. The effect of the floods on industry was similar to the effect upon agriculture.

Investigations made by this office indicate that damages to 400,000 acres of land in drainage and levee districts, added to the flood loss in cities and to railroads and public property amounted to over \$8,000,000 from the flood of 1926 and over \$10,000,000 from the flood of 1927. Along the Illinois and Mississippi River valley about 225,000 acres of



Liverpool on the Illinois River showing broken levees and flooded farm lands.

land were under water from two months to two years due to the inability of the local inhabitants to repair their levees, and remove the water by pumps or natural drainage.

EMERGENCY FLOOD RELIEF LAW.

By direction of Governor Small, the Superintendent of Waterways and engineers of this division personally visited Beardstown, Cairo and

other flooded areas for the purpose of securing first hand information as to existing conditions as a basis for recommending plans for flood relief and protection, including needed legislation.

At the request of a Legislative Joint Committee on Flood Relief appointed in response to a special message from Governor Small asking that a conference committee be appointed, the writer undertook to revise and consolidate several flood relief measures which had been introduced by various members of the legislature. This measure carrying an appropriation of \$1,500,000 for flood relief and known as Senate Bill 576, (copy of which is included in this report) was enacted into law with but one negative vote.

BEARDSTOWN SEA WALL.

The legislature also reappropriated the sum of \$350,000 toward the cost of a sea wall and levee to protect the city of Beardstown from overflow by the Illinois River. This legislative appropriation was supplemented by contributions of \$46,000, of which the Chicago, Burlington & Quincy donated \$41,000 and the Baltimore and Ohio \$5,000, making a grand total of \$396,000, which sum was estimated by this office to be sufficient to build a concrete wall along the river front with earth levees connecting the river wall with the high lands back of the city.

FLOOD RELIEF PLANS.

Anticipating the enactment of Senate Bill 576 for Flood Relief in Illinois, the writer on June 27, 1927, advised Mr. L. D. Cornish, Assistant Chief Engineer of the Division of Waterways, that Mr. M. G. Barnes, Chief Engineer, had found himself unequal to the task of looking after the Flood Relief work in addition to his other duties in connection with the Illinois Waterway project and that with the approval of the Director, Mr. Cornish would be in engineering charge of all such work including the construction of the sea wall and levee at Beardstown.

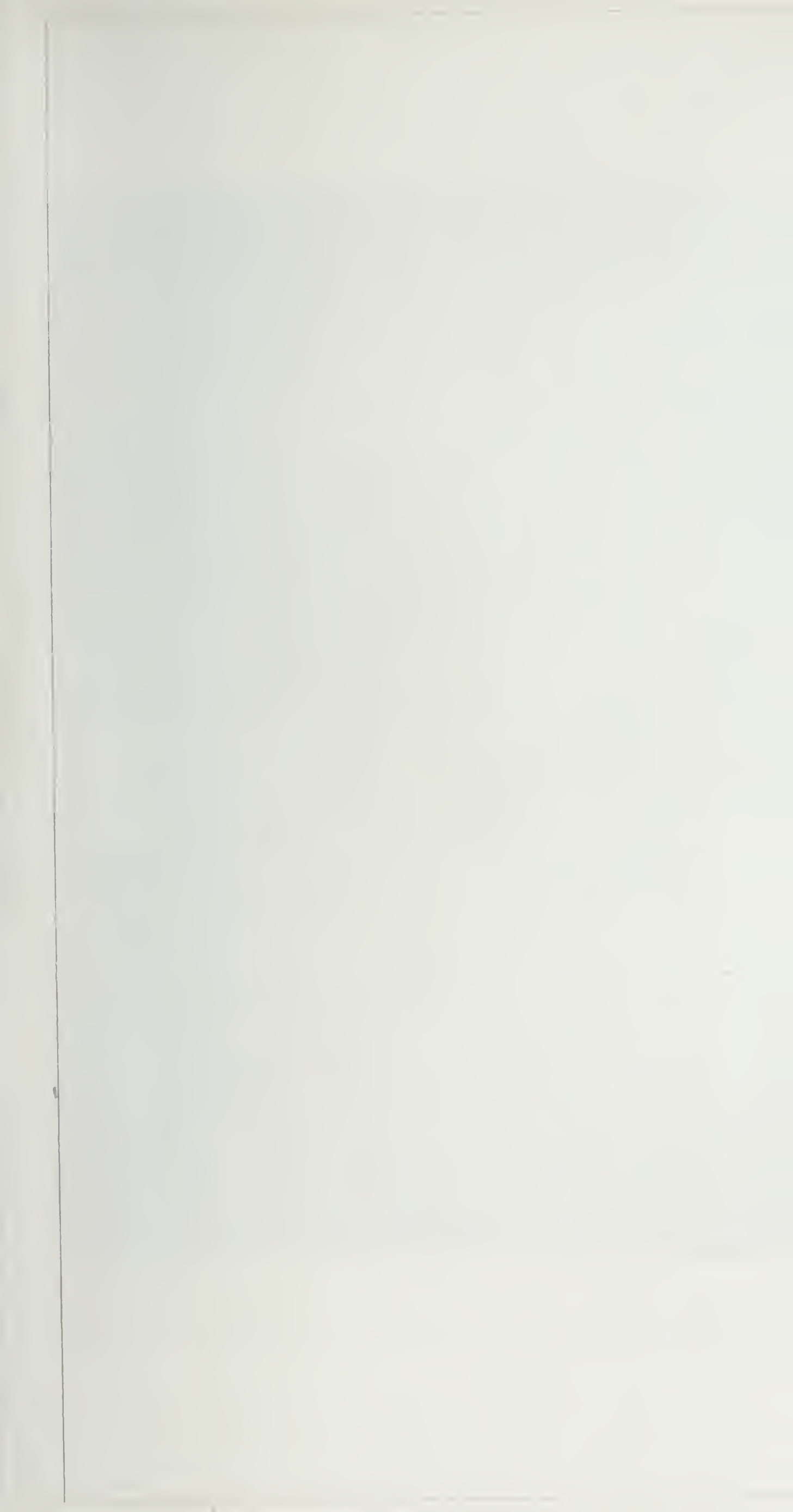
Mr. Cornish was informed that in carrying out this work it would be necessary for him to depend largely upon a special force of employees for work in the field, but that he would be at liberty to call to his assistance members of the regular force who might be in possession of special information or when they could be of particular service, with the understanding, however, that this was to be done with as little interference as possible with the regular work of such engineers and employees.

In connection with the levee repair work a report was asked for covering the entire work to be accomplished, divided into primary and secondary classifications with separate estimates as to the probable cost of both classes of work.

RULES GOVERNING RELIEF WORK.

In this connection, the following rules were laid down:

"1. The right-of-way for levee and borrow-pits should be provided free of cost to the State with written authority from the owner or owners to enter upon and construct or repair the levees.





This picture taken October 15, 1926, shows the city of Beardstown inundated and completely surrounded with water. The South Beardstown Drainage and Levee District is shown in the right foreground. The channel of the Illinois River is indicated by the highway and railroad bridges shown in the left middle distance.

The Illinois Legislature appropriated \$350,000 and \$46,000 contributed by the Chicago, Burlington & Quincy Railway and the Baltimore & Ohio Railway to pay the cost of constructing a concrete wall along the river bank and to provide earth levees connecting the river wall with the high ground back of the city. Beardstown has a population of 7,000. Nine-tenths of the city was under water up to a maximum of 15 feet.

2. So far as possible profile drawing and description of the work to be done, with specifications, should be prepared for each and every separate contract or piece of work.

3. Standard form of contract should be prepared of which the profile drawing, description and specifications should be a part, with optional clauses



Airplane picture showing flooded Lacey and Langellier Drainage and Levee Districts above the levee and flooded portions of West Matanzas District below the levee.

providing for lump sum settlement upon completion of the work or installment payments on monthly estimates.

4. In all cases where payment is to be made on monthly estimates, a surety company bond equal to one-half the amount of contract should be provided for."

THE FLOOD RELIEF LAW.

(Senate Bill No. 576. Approved July 7, 1927.)

An Act making an appropriation to furnish emergency relief in the areas in Illinois which have been inundated or damaged by floods and for the temporary construction, repair and reinforcement of levees in such districts.

WHEREAS: As the result of recent abnormal weather conditions, certain large areas of the State of Illinois have been inundated and damaged by flood waters, particularly in the valleys of the larger streams of this State, and

WHEREAS: Such flood waters have broken or injured levees in this State, and have endangered other levees, and

WHEREAS: The suffering and loss on account of these conditions have been widespread and have become a matter of great public concern, and

WHEREAS: The residents of the areas so afflicted are unable to reclaim for cultivation large areas of overflowed lands or to make the temporary repairs or reinforcements to levees which are necessary to prevent further loss and damage, and

WHEREAS: Any relief to be administered by the State should be equitably distributed to relieve the needs and suffering of the different communities with as little burden and expense to the taxpaying public as possible; now, therefore,

Be it enacted by the People of the State of Illinois, represented in the General Assembly:

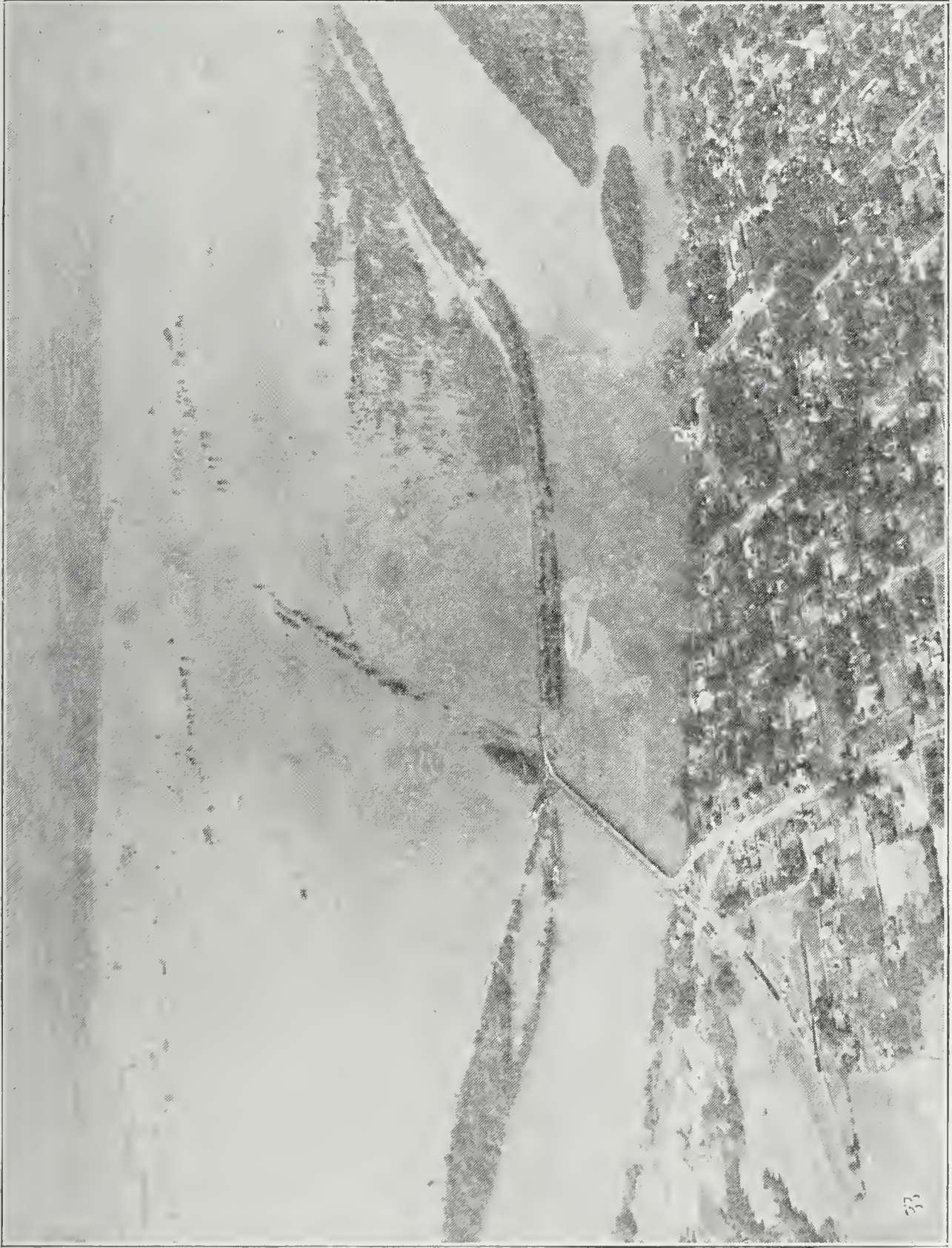
SECTION 1. There is appropriated to the Department of Purchases and Construction, for the biennium commencing July 1, 1927, the sum of one million five hundred thousand dollars (\$1,500,000), or so much thereof as may be necessary, for the purpose of furnishing all necessary and proper emergency relief in areas which have been inundated and damaged by flood waters and for making temporary repairs to, or furnishing temporary reinforcements for levees which have been or which are in danger of being damaged by the flood waters of the last several months, and to reclaim or restore inundated and overflowed lands.

SEC. 2. This appropriation is subject to the provisions of "An Act in relation to State finance," approved June 10, 1919, as amended.

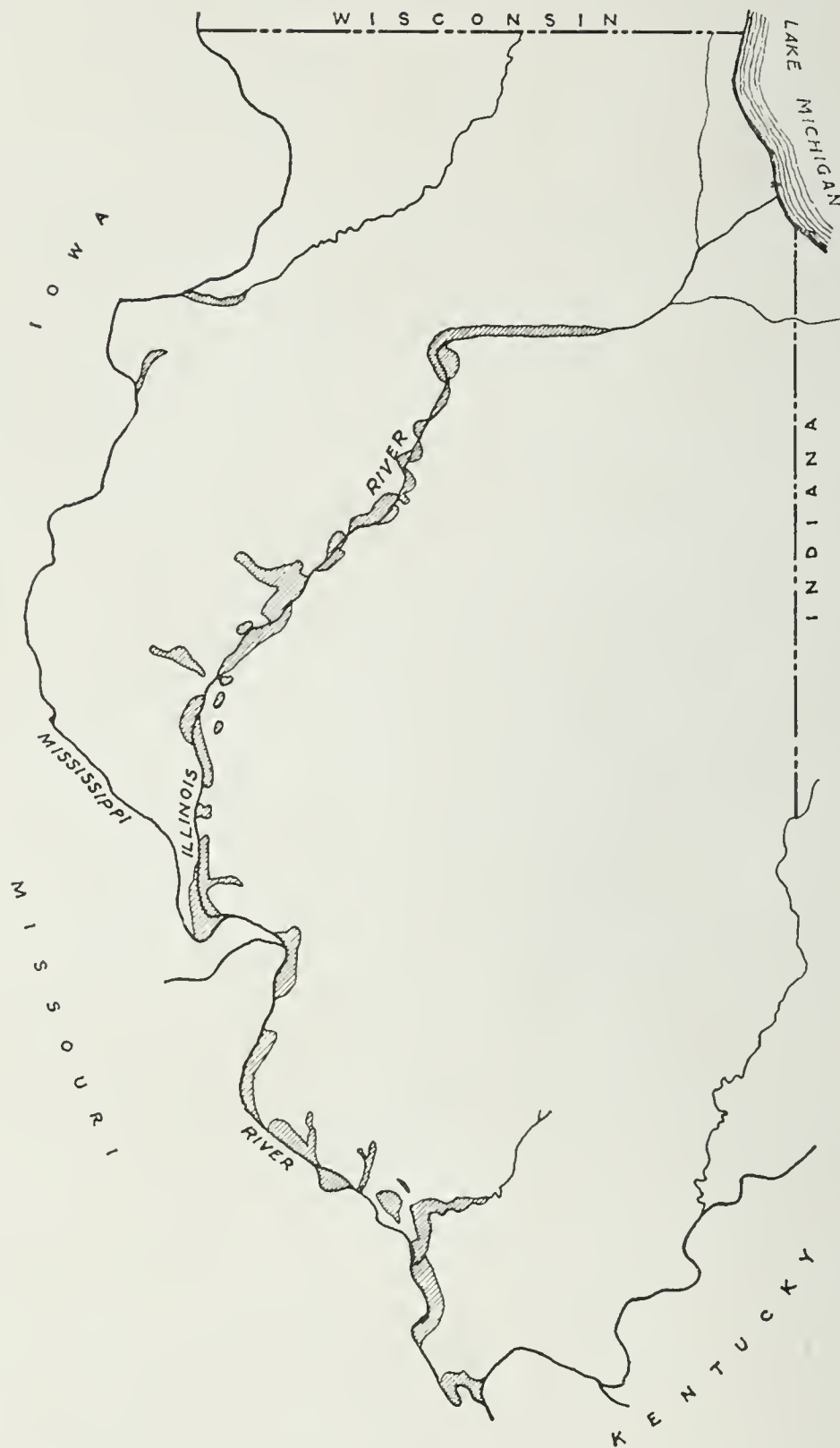
SEC. 3. Because of the facts recited in the preamble of this Act and the further fact that relief measures to be effective to the greatest degree, must be promptly put in operation, an emergency exists and this Act shall take effect upon its passage.

ATTORNEY GENERAL'S OPINION.

In anticipation of the enactment of the Flood Relief bill, (S. B. 576) and to avoid, so far as possible, any delay in carrying out the provisions thereof, the Attorney General was asked for an advance opinion



Meredosia, on the Illinois looking west over McGhee Creek levee and drainage district.



Where the Illinois and Mississippi Rivers overflow onto thousands of the most fertile acres in the world. The shaded portions are the areas which are habitually overflowed by the rivers when high waters come, or which were submerged during the floods of 1922, 1926 and 1927. Detailed reports show that total losses in excess of \$30,000,000 were inflicted during the six-year period covered by these flood times. Thousands were driven from their homes, merchandise was ruined and hundreds of thousands of acres of farm lands were covered with water for months at a time.

After a survey of the flood conditions in Illinois in 1927, Governor Small in a special message to the Legislature, recommended the appropriation of \$1,500,000 for emergency flood relief and to repair, rebuild and strengthen the damaged levees along the Illinois and Mississippi Rivers. The State Legislature passed the appropriation and work was started immediately.

as to the powers, duties and authority of the Director of the Department under the proposed law, which was rendered as follows:

June 30, 1927.

File No. 1087

Bills:

Senate Bill 576,
Flood Relief.

Hon. Leslie Small,
Director,
Department of Purchases and Construction,
Springfield, Illinois.

Dear Sir:

I am in receipt of your letter of the 28th instant, in which you enclose what you state to be a copy of Senate Bill No. 576, commonly known as the "Flood Relief Bill." You ask me to advise you as to the powers, duties and authorities of the Director of the Department of Purchases and Construction under this act, in making repairs to damaged levees and in the work of reclaiming overflow land with special reference to the following:

"(1) Would it be lawful for the Department to do any part or all of this work by the employment of hired labor, the purchase of materials and supplies and the purchase or rental of necessary equipment?

(2) Would it be lawful for the Department to make contracts with private persons or corporations (or with quasi public corporations) to provide labor, materials and equipment and to perform any part of the work required at an agreed price, or on a cost plus basis?

(3) Will it be necessary for the Department to advertise for bids on contracts or materials for levees and reclamation work under this act? If so, in what publications and for how long must such advertising appear?

Because of the emergent situation which this law is intended to relieve, this Department has caused a preliminary survey of conditions to be made in a large part of the flood areas and I am advised that, in some cases, contractors with adequate equipment, are now situated at points where emergency work is needed.

It is probable that advantageous contracts could be made in such cases, if the Department has authority to enter into same without the necessity of waiting to advertise for competitive bids. In other words, a contractor who has his equipment on the job can afford to work cheaper than one whose equipment must be brought from afar, but such contractors would have to increase their charge to cover delays if advertising and competitive bidding are held to be essential."

In answer to your questions Nos. 1 and 2, beg to advise that I can find no constitutional requirement or statutory provision directing the manner in which you may cause this work to be done as far as a method of contracting for the same is concerned.

In answer to question No. 3: The constitution and statutes are silent as to the requirements to advertise for bids on contracts, except such contracts pertaining to public printing and binding and fuel. (See section 25 of Article IV of the Constitution and sections 77 to 132, inclusive, of chapter 127 of Smith-Hurd's Illinois Revised Statutes.) Both the statute and the Constitution being silent on these matters, such procedure as to the carrying out of the provisions of said Bill 576

is left to the discretion of you as Director. Just how far your judgment can go in making repairs to damaged levees and the work of reclaiming overflowed lands is a matter not easily understood and our courts so far have said very little that gives us much light on this question.

As was said in the case of *Hagler v. Small*, 307 Ill. 460, at 474:

“Whether a tax or an appropriation is for a public or private purpose is a question not always easy of determination. In deciding whether such purpose is public or private, courts must be largely influenced by the course and usage of the government, the object for which taxes and appropriations have been customarily and by long course of legislation levied and made, and what objects have been considered necessary to the support and for the proper use of the government. Whatever lawfully pertains to this purpose and is sanctioned by time and the acquiescence of the people may well be said to be a public purpose and proper for the maintenance of good government. (*Loan Ass'n. v. Topeka*, 20 Wall. 655.) What is for the public good and what are public purposes are questions which the Legislature must in the first instance decide * * *.

The power of the State to expend public moneys for public purposes is not to be limited, alone, to the narrow lines of necessity, but the principles of wise statesmanship demand that those things which subserve the general wellbeing of society and the happiness and prosperity of the people shall meet the consideration of the legislative body of the State, though they oft-times call for the expenditure of public money. If it can be seen that the purpose sought to be obtained is a public one and contains the elements of public benefit, the question how much benefit is thereby derived by the public is one for the Legislature and not the courts.”

In view of the language of the Supreme Court, it appears to me that the Legislature in stating the purposes for which said appropriation mentioned in said bill may be used in so far as such bill limits such purposes to the furnishing of all necessary and proper emergency relief by making temporary repairs or furnishing temporary re-enforcements for levees which have been, or which are in danger from being damaged by flood waters same is valid.

In repairing and in re-enforcing levees the State by the use of such funds would subserve the general well-being of society and the happiness and prosperity of the people in general. It would protect the lives of those persons who reside in the territory affected by such flood waters.

Further, the Director is empowered to use such appropriation for the purpose of necessary proper emergency relief in areas affected.

However, that part of section one which provides that such fund may be used for the purpose “to reclaim or restore inundated or overflowed lands” presents a question of more serious difficulty. In the first place, the title of the Act, which is as follows:

“An Act making an appropriation to furnish emergency relief in the areas in Illinois which have been inundated or damaged by floods and for the temporary construction, repair and reinforcement of levees in such districts.”

presents the question whether or not the title of such Act is broad enough to include the power to reclaim or restore inundated lands. Giving an emergent relief could hardly be extended to include the reclamation or restoration of inundated lands. (See section 13, Article IV of the Constitution.)

In construing said clause of said section one, to-wit: “to reclaim or restore inundated and overflowed lands” it is necessary to take into con-

sideration also section 20 of Article IV of the Constitution, which provides as follows:

“The State shall never pay, assume or become responsible for the debts or liabilities of, or in any manner give, loan or extend its credit to or in aid of any public or other corporation, association or individual.”

No question would arise under this provision of the Constitution as to the right of the Department of Purchases and Construction to use any part of such funds for the restoration and reclamation of lands owned by the State or some division of the State.

But as to the restoring or reclaiming of inundated lands which are owned by private parties, a more serious question arises. A search of the authorities of this State fails to disclose where such question has been passed upon by our higher courts. The lands belonging to private parties and having been inundated or overflowed by the unusual floods during the past year would be aided by the use of the expenditure by the State of money to restore such lands to the condition in which they were before the flood.

By reason of such apparent defect in the title and by reason of such part of said section 1 as appears to violate section 20 of Article IV of the Constitution, aforesaid, I am not prepared to hold that such act is not free from constitutional objection.

But the constitutional objection to the use of such funds for the purpose “to reclaim or restore inundated lands” would not apply to the other purposes enumerated in said bill and as to such other purposes enumerated in said bill I make no objection as to the form or constitutionality thereof.

Because therefore of such constitutional questions arising under said bill, it would appear to me that such contracts entered into by the Department of Purchases and Construction should not include work that has to do with the reclaiming and restoring of inundated lands.

Since these contracts are of such nature that it will be unnecessary for your department to submit them to public bids, of course it follows from what has been said herein that no publication of notice for bids on contracts or materials will be required.

Very truly yours,

(Signed) OSCAR E. CARLSTROM,
Attorney General.

LAKE LEVEL LITIGATION.

In cooperation with the Attorney General of Illinois and with engineers and attorneys for the Sanitary District of Chicago, the Division of Waterways aided in preparation and presentation of evidence for the defense, in the hearings before Charles Evans Hughes as Special Master for the Supreme Court of the United States in the proceedings brought by the State of Wisconsin and others against the State of Illinois and the Sanitary District of Chicago to restrain the diversion of water from Lake Michigan at Chicago through the Chicago Sanitary and Ship Canal into the Mississippi River by way of the Des-Plaines and Illinois rivers.

The subject of this litigation was deemed to be of so much importance to the Waterway interests of the State of Illinois that unlimited time was devoted to investigation of the facts involved in order that the testimony of the expert witnesses for the State might be full and complete. Mr. M. G. Barnes, Chief Engineer, and Mr. Murray Blanchard, Hydraulic Engineer for the Division, spent much time in preparation for this case and both of them were in Washington in attendance upon the hearings before Judge Hughes from November 28 to December 19, 1926; February 19 to March 6, 1927; March 19 to 28, 1927; May 29 to June 4th, 1927; in addition to the foregoing Mr. L. D. Cornish, Assistant Chief Engineer, was in Washington from February 19th to March 6, 1927.

DATA COMPILED IN CHICAGO OFFICE.

In the Chicago office the following data were compiled for testimony, and exhibits were prepared, for use in the hearings at Washington before Special Master Chas. Evans Hughes:

1. History of the Illinois & Michigan Canal having a bearing on early diversion of water from Lake Michigan.
2. History of Illinois Waterway Reports, Applications for Permits, Permits, Hearings, Litigation, Acts, Agreements, etc., showing the various efforts that have been made to obtain the diversion and construct the waterway.
3. Collection of correspondence and negotiations concerning the amount of diversion.
4. Studies of possible power development in Illinois Waterway.
5. Compilation of transportation data and studies of harbor facilities.
6. Studies of the effect of various diversions on the DesPlaines, Illinois and Mississippi rivers.
7. Studies of the effect of proposed regulating and compensating works upon water levels of Great Lakes.
8. Preparation of charts, compilation of statistics and studies concerning transportation on the Great Lakes.
9. Preparation of tables and charts, compilation of data and studies of the water supply and run off of the Great Lakes.
10. Compilation of maps, designs and data relating to the construction of the Illinois Waterway.
11. Effect of improvements on the connecting channels of the Great Lakes.

CONTROVERSIAL POINTS INVOLVED.

The main controversial points in the hearing, on which the Division Engineers testified, were:

1. Excavations made in the narrows of the St. Clair River at Port Huron had the effect of lowering Lakes Michigan and Huron some five inches.
2. Regulation or compensation are practical means to counteract the effect of lake level lowering.

3. Diversion of water from one watershed to another is not without precedent in this country.

4. Total elimination of diversion at Chicago would be impracticable and endanger the lives of millions of people.

5. A withdrawal of 10,000 second feet at Chicago has an economic value on a par with or exceeding its value in flowing to the St. Lawrence River.

6. The value of the Illinois Waterway to consumers and shippers in reduction of cost of transportation over cost by rail would exceed \$1.00 per ton and amount to at least \$30,000,000 per year, which is equal to a capitalized value of \$750,000,000. (Barnes 5891, 5892.)

7. Evidence submitted to show that an economic disaster fairly estimated at one hundred million dollars is involved in the proposed destruction of the Illinois Waterway by eliminating diversion entirely.

“CHICAGO BUSINESS VIEWS WATERWAY.”

Commerce Association Inspects Illinois' Preparations to Connect Great Lakes and Gulf.

Note: The following article, which appeared in Chicago Commerce November 6, 1926, is from the pen of Mr. Wm. Hudson Harper, Editor of that publication:

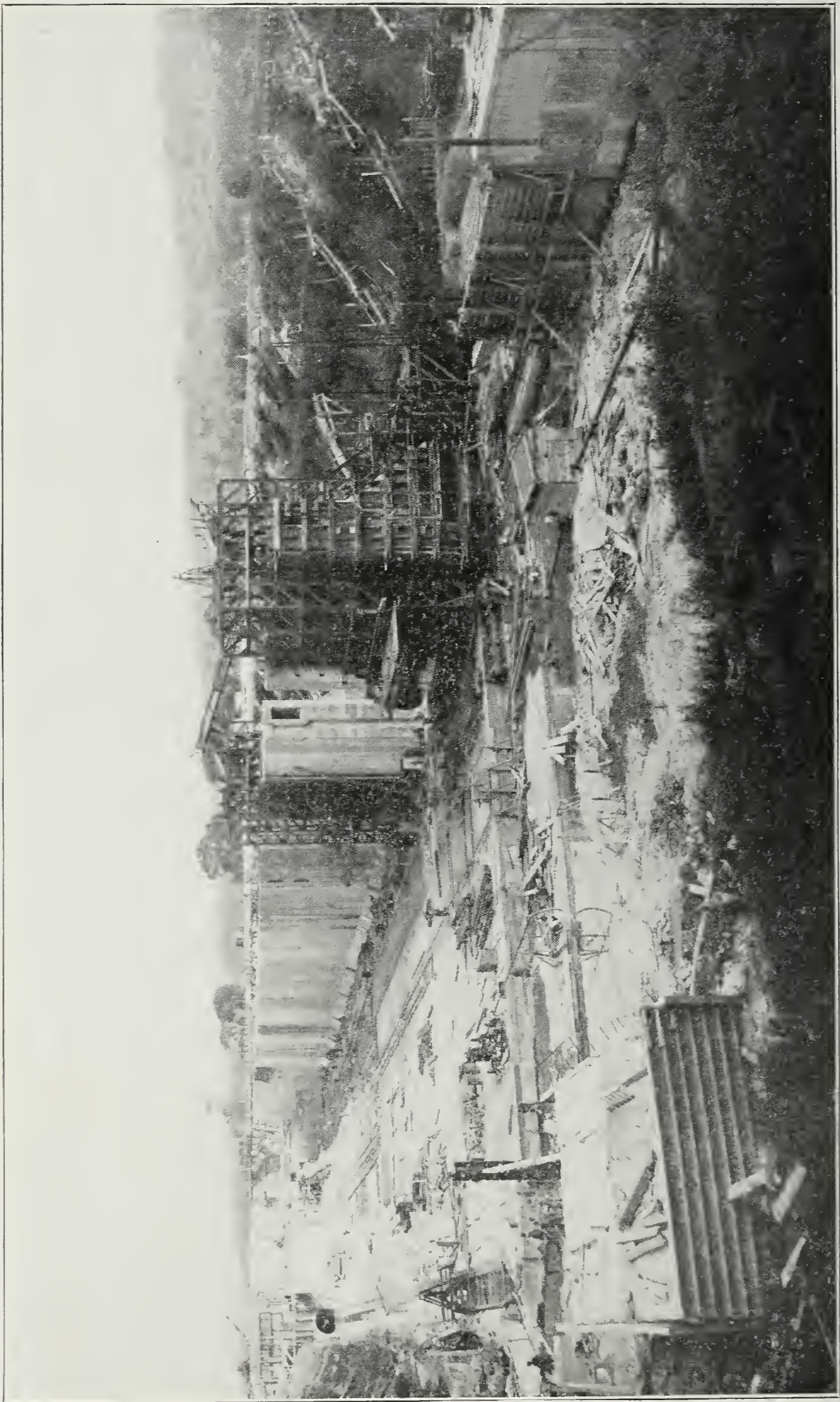
A Chicagoan perhaps takes for granted his city's drainage and navigation system. He is content that a great city no longer makes a cesspool of its fountain. He votes for bond issues and officers and the ways and means of drainage disposal and waterway improvement, but does he really know or anywhere near evaluate the Chicago terminal of the Lakes-to-the-Gulf waterway to be—soon to be, revolutionary to be?

Now, a projected water traffic route between Chicago and New Orleans, the flowing way for manufacturer and farmer from Great Lakes to sea, has no self-starting or self-finishing principle. Individual states, government of the United States, competing cities, all must see an improvement of this nature as a major, a continental undertaking, and the force to see and demonstrate the carrying of it into execution is business. Politics plays its part, but it is business that conceives and realizes, and therefore business must know.

BUSINESS LEADERS GO VOYAGING.

Thursday, October 28, President William R. Dawes and John T. Pirie, chairman of the Association's Transportation Committee, took some twenty-five representative business men, together with representatives of the press and members of the official staff of the Association of Commerce, for an all-day visit to the Illinois waterway project. The excursion was realized to the greatest advantage through the cooperation of William F. Mulvihill, superintendent of the State Division of Waterways; through the courtesy of the Sanitary District of Chicago by use of its boat, the Edora, and by virtue of various preliminary preparations conducted by J. P. Haynes, traffic director of the Association of Commerce.

It was the idea of Mr. Dawes and Mr. Pirie to aid Chicago business to discover the significance, in an industrial and transportation sense, of the great drainage channel—what is being done and has been planned to be done to make a practical waterway route in that section of Illinois between Chicago and the Mississippi River, for which Illinois is responsible, namely, between Lockport and Utica, an improvement which the citizens of the State have formally resolved to make and to the construction of which they have dedicated a bond issue of \$20,000,000.



Photograph showing construction progress on Starved Rock lock. By direction of Governor Small the first bids of \$2,825,040 were rejected. The present contract price is \$1,475,832.

FIVE LOCKS AND DAMS IN SYSTEM.

What an expedition of business men set forth to see was the engineering and projected engineering along a waterway route extending from Lake Michigan some 95 miles down the valley of the Illinois River, the southern end of this stretch being marked by nature by the historic Starved Rock, in front of which an economic instrumentality to form the last dam and lock proposed for the Illinois improvement section of the waterway is now under construction.

Five dams and locks are embraced in the section between Lockport, near Joliet, and Starved Rock. At Lockport is the first, at Brandon Road, a few miles away, the second; at Dresden Island, more than fifty miles from Chicago and fifteen miles from Joliet, is the third. At Marseilles is already finished the fourth lock and dam, and this construction is eighty miles from Chicago, and at Starved Rock a mighty excavation foreshadows the future site of the fifth and last lock and dam. Two of the five great units may be said to be complete, and perhaps three years will see all units finished.

The expedition saw all that could be seen in a long day, twilight enveloping its members as they gazed almost with wonder at the partly water filled hole which is to be the scene of the lock and dam at Starved Rock.

WHO WENT TO SEE THE BIG THING.

Men who accepted President Dawes' invitation to make this interesting excursion—not a junket but a university course on waterway economics—were the following, Mr. Mulvihill being general guide, philosopher and friend:

B. F. Affleck, president of the Universal Portland Cement Company, a corporation concerned in big tonnage; V. L. Alward, president of the American Furniture Mart, whose monumental institution centers the furniture trade in Chicago; M. G. Barnes, chief engineer of the Waterways Division of Illinois and one of the creative spirits of the Panama Canal; Frederick T. Boles, a waterway shipper of years and a leader in promotion of waterways; Joseph K. Brittain, president of the Chicago Real Estate Board and chairman of the Association's Committee on Industrial Development and Public Improvements; J. S. Brown, representing the Board of Trade; Roy W. Campbell, president of the Chicago Shippers Conference Association; Sheldon Clark, hardy lake man and also vice-president of the Sinclair Refining Company, an important industrialist; L. D. Cornish, assistant chief engineer of the State Division of Waterways; John V. Farwell, one of Chicago's foremost merchants and citizens; H. C. Gardner, engineer, chairman of the Great Lakes-St. Lawrence Tidewater Association and chairman of the Association's Committee on Harbors and Waterways; John M. Glenn, veteran secretary of the Illinois Manufacturers Association, and an all-State personality; E. T. Harris, president of the Payson Manufacturing Company; Dr. Robert H. Harvey, president of D. B. Fisk & Company; Lachlan Macleay, secretary of the Illinois River Division of the Mississippi Valley Association; James E. MacMurray, chairman of the board of the Acme Steel Company.

And there were Martin B. Madden, twenty-two years a congressman from Chicago and a good one, and chairman of the Appropriations Committee of the House; R. C. McManus, Swift & Company; John T. Pirie, Carson Pirie Scott & Company; Maj. Rufus W. Putnam, late United States resident engineer and now engaged by the Commercial Club of Chicago to conduct a harbor survey and submit a harbor plan; Robert Isham Randolph, Randolph-Perkins Company, engineer, son of Isham Randolph, distinguished for service in connection with the Drainage Canal and the Panama Canal; Alexander H. Revell, Jr., president of his father's historic house; Col. Edward H. Schulz, resident district engineer, U. S. A., and successor to Maj. Putnam; Eugene S. Taylor, manager, Chicago Plan Commission; H. B. Utley, vice-president of the International Harvester Company and representing great potential shippers by water; Ezra J. Warner, president of Sprague, Warner & Company; M. B. Wheeler, representing the president of the sanitary district; four representatives of the press, including Chicago Commerce; Henry Seavey, representing Underwood & Underwood, photographers, and the fol-

lowing members of the Association's official staff; J. P. Haynes, traffic director; L. A. Dumond, manager, Industrial Department; C. W. Judd, assistant business manager; Col. H. F. Miller, manager, Domestic and Foreign Commerce committee; Thomas Wolfe, secretary, committee on Harbors and Waterways.

The party was joined at Lockport by A. T. Griffith, chairman of the Waterways committee of the Peoria Association of Commerce; W. E. Hull, Congressman, Peoria, and representatives of the Peoria Journal and Star.

INDUSTRIAL PLANTS AND SITES.

The LaSalles, Marquettes and Joliet of this latter day embarked on the Edora at the Goodrich dock at 8:30 a. m. and proceeded down the river and canal to Lockport. Passing the Wacker Drive, observers noted facilities provided on its first level for the handling of river traffic. In the continuing voyage of discovery, as the boat passed down the river and entered the great canal, big plants were noted here and there along the river banks and also many sections of frontage in disrepair and neglect. Power houses told their dynamic story as did the transforming works of the sanitary district power installation at Lockport, the current being conducted several miles up the river. Bridges of various types loomed high. It was a river vitally connected with the city's welfare but not under the intensive development, industrially speaking, commensurate with its opportunities.

Chicago knew more about the drainage canal at the years of its birth than it knows today. A very impressive accomplishment it is. Its economic potentialities are enormous. The length of the main and power channel is 29 miles; the length of the river, from the lake to Robey Street, 6 miles, and the length of the river diversion channel 13 miles. The great cut has at the north an earth section and at the south a rock section. The canal's present capacity is 600,000 cubic feet per minute. The nominal minimum depth of water in the main channel is 22 feet, and the width of the main channel varies at the top from 198 to 225 feet. Construction costs of the great work up to December 31, 1923, were \$94,371,038. In 1924 the equalized value of the property of the sanitary district was declared to be \$1,917,628,603 and the total bonded debt \$37,895,000.

WHEN BEGUN AND FINISHED.

Work on the drainage and ship canal was begun September 3, 1892, and on January 5, 1900, water was turned in. The main channel extension was completed on August 27, 1907, and on November 26 of that year the first electric current was delivered to Chicago from the Lockport power house. Construction of tributary improvements followed in other years.

The sanitary district has an area of 437.39 square miles, including all of Chicago and forty-nine other incorporated cities and villages.

As the observation tour progressed, particularly through the extensive rock cut section, the magnitude and dignity of the engineering work became more apparent, and questions were generally asked about the vast accumulations of rock, coarse and fine, constituting, on either side of the canal, the spoil banks. These no inconsiderable hills of stone, bordering the canal for many miles, had trees growing out of their barren bosoms. For certain construction these little mountains are being resorted to by contractors, stone being deposited in barges and brought to the lake front for such use as the building of breakwaters. It seems to be a fact that this residue is not particularly available in every sort of construction work, it being cheaper for some of the requirements of breakwater building to quarry the necessary stone.

A barge of stone passed the voyagers, and also a barge of oil. The nature of these shipments prophetically spoke. When the waterway is open, and the Mississippi states and Great Lakes states are in waterway contact, these stone mountains may in one way or another become actual instead of potential assets. For the time one can think of them as waiting wealth, and the mass can be thus inventoried.

STONE ISLAND IN THE LAKE.

Col. Randolph was asked what all these miles of stone would amount to if their equivalent were reared in some imaginary cube in the heart of the loop or deposited off the lake front. The colonel figured for a few minutes, and he made this answer:

"The grand total of glacier drift and solid rock was 42,229,035 cubic yards. The rock when broken up expands about 80 per cent, and therefore the volume of the rock spoil banks was nearly 22,542,580 cubic yards. If we were to remove the whole volume of spoil, that is, both earth and rock, and deposit it in Lake Michigan in 40 feet of water, we would have an island one mile square with its surface twelve feet above water."

The observation party viewed at Lockport the new locks and existing power house, the former a structure of magnificent proportions and of a size unexpected even in a commonwealth of big things. The exploring party stood upon one of the walls of the monster lock, and Mr. Mulvihill explained that under the waterway act of 1919 the DesPlaines and Illinois rivers are being canalized to connect the Chicago drainage canal at Lockport with the navigable waters of the Illinois River near Utica, a distance of sixty-five miles. In the section of the Illinois waterway now under development, the whole totaling 1,600 miles from New Orleans to Chicago, there are to be five locks having a total lift of 126 feet—at Lockport 41 feet, at Brandon road 31 feet, at Dresden Island 17 feet, at Marseilles 21 feet, at Starved Rock 16 feet. Under the pending Illinois improvement bill there will be two more locks in the section between Utica and Grafton.

GIGANTIC LOCKS IMPRESS VISITORS.

Scanning the huge and empty lock at Lockport, the explorers, guided by Mr. Mulvihill, realized how big a utility is a structure which is 600 feet long with a lift of 41 feet and a width of 110 feet. They looked upon engineering already 95 per cent finished, and later they passed two sites for dams and locks not yet under contract. They saw at a distance the general location of the Marseilles lock and dam, and when "the shades of night were falling fast" they stood beside the huge excavation at Starved Rock, which the adjoining Illinois River has filled with water to the extent, at one end, of twenty-five feet. This huge volume of water must be pumped back into the river, a setback by storm and flood to the engineers which will be as great as two months. The navigable river channel in this same section under State improvement will be not less than 150 feet at the bottom, with a depth of not less than 8 feet, which will be increased to 9 feet without extra cost, if the present annual average diversion of water from Lake Michigan of 8,500 cubic feet per second is continued.

The Chicago navigators were taken from Lockport in cars by members of the Joliet chamber of commerce and were lunched by them in their interesting new building. The guests were warmly received by prominent Joliet business men, and after a delightful luncheon there were short talks by the chairman, who was State Senator Barr, and Mr. Mulvihill, Congressman Hull, Congressman Madden and President Dawes.

TALKS AT JOLIET LUNCHEON.

Mr. Madden, a reliable friend of the great central west project, suggested that rather than a sectional undertaking this was a national undertaking in significance and consequence.

Mr. Hull, who had been lately visiting the far northwest as well as the southwest, had found an intelligent and sympathetic interest in Illinois' great project. He urged Chicago to understand the magnitude and importance of the waterway idea and its undertaking. He had found inspiration in the enterprise of Houston, Texas, which built on its own a fifty-mile waterway from the sea to make of that cotton port an interior Galveston, where already in the artificial port and canal Mr. Hull had counted seventeen sea-going ships.

Mr. Dawes assured the Joliet representatives and all others concerned in the common cause that Chicago appreciated the value of what it was after;

that it was after it to get it, and that it solicited the support of every interest involved.

JOLIET'S LEADERS AT CONFERENCE.

The Joliet hosts of the Chicago party were Senator R. J. Barr, chairman of Joliet chamber of commerce waterway committee, presiding at luncheon; Theo. R. Gerlach, president Joliet chamber of commerce, president of the Gerlach-Barklow Company; J. R. Blackhall, past president of chamber, also operating vice-president of Chicago & Joliet Electric Railway Company; A. H. White, district manager of Illinois Bell Telephone Company, and a director of the chamber; Wm. Richards, director; L. C. Stephens, district manager of Public Service Company of Northern Illinois, and chairman of intercity committee; Geo. Buck, Werden-Buck and Company; Walter Jones, Farrell Manufacturing Company; Wm. Kemp, Edw. Morton, Col. Fred Bennitt, waterway committee; Irving A. Berndt, managing director of chamber.

The touring party moved by a special car of the Illinois Traction system from Joliet to Belle Isle, forty-one miles, to get an impression of the surroundings of the Marseilles lock, and then the party continued on to Starved Rock, arriving in time in the deepening twilight to see the beginnings of lock construction on a Panama canal scale. The party returned to Ottawa to take a special Pullman car and diner of the Rock Island lines and reached Chicago about 9:30 o'clock.

Among the best informed of Illinois' waterway champions is the Superintendent of Waterways, William F. Mulvihill, who during the day of the tour made several little talks in answer to questions. In such talks was information such as this:

SUPERINTENDENT MULVIHILL EXPLAINS WORK.

"Secretary Hoover is educating the public about our inland waterways. He is leading the Nation to think about the Mississippi system of 9,000 miles, one-third being trunk lines and two-thirds laterals. There is a main north and south line between New Orleans and Chicago and an east and west trunk line of 1,500 miles from Pittsburgh through Cairo to Kansas City. The north and south line is 1,600 miles long, and the locks of the Illinois section are built 110 feet wide, with 600 feet of usable length, and can handle 9,000 tons of freight at one lockage.

"To more easily visualize the magnitude of tonnage capacity of these locks, the picture can be expressed in box car loadings. Using the average railroad car loading for the country, the capacity of each of these locks at one locking is found equivalent to a freight train 2.84 miles long, or nearly three miles long.

PREPARING FOR EQUIPMENT INTERCHANGE.

"The locks are uniform in size with those being built by the government in the Ohio River, and so the trunk lines can interchange standardized equipment; and so the importance appears of the government improving the lower Illinois and Mississippi rivers so as to make a uniform 9-foot channel in the lower Mississippi.

"The work of the federal barge line between St. Louis and New Orleans shows that with open river navigation and a dependable channel of 9 feet, the cost of haul between Chicago and the Gulf would be greatly reduced. Let us not forget that the Panama canal brought about the reduction of a coast to coast haul of from \$300 to \$1,000 per carload. When the Illinois waterway and the Mississippi system are one, barge freight can move, by all-water routes between inland industrial centers and seaboard ports without breaking bulk.

"Railroad ton-miles are said to double every ten years. Rail congestion invites waterways and highways. A dollar will move a ton of freight four miles by horse and wagon, twenty miles by truck, 100 miles by railroad, but 750 miles on the Illinois and Mississippi waterway and 1,000 on the freight boats of the Great Lakes.

"The Illinois River drains about 40 per cent of the land area of the State, fertile land producing more than 200,000,000 bushels of grain, of which 60 per cent is exported. Truck transportation by good roads would place this surplus on barges for Chicago or New Orleans and be moved at materially less than at rail rates.

"Chicago consumes 36,000,000 tons of coal every year, and at least 15,000,000 tons would move by river and canal from southern Illinois and Kentucky at a saving of over \$11,000,000 per year, or at least 75 cents a ton.

"So much for the farmers. The manufacturers and other shippers of Chicago, and all classes of shippers from Lake Michigan ports are interested in a cheap route south to southern and western states and beyond. Domestic markets are interested in South America, Pacific Coast and Asia. Such a transportation route would also reduce the cost of haul on foreign shipments imported through New Orleans, as well as on domestic products of southern origin required in the north. The north wants sugar, coffee, rice, sulphur, sisal, etc.—millions of tons.

"Chicago business men have seen today what has been accomplished, and we advise them of plans for locks and dams not yet provided for, namely, at Brandon road and Dresden Island, and for which contracts will be let as soon as titles and needed right-of-way can be secured and bids offered. We estimate that it will take three years from the time the last contract is let before the system is complete."

ILLINOIS AND MICHIGAN CANAL LAW AMENDMENT.

Lease of Illinois-Michigan Canal.

At the election held November 2, 1926, a vote was taken on the question of adopting an Act of the Illinois General Assembly authorizing the lease by the Department of Purchases and Construction of certain lands constituting a part of the Illinois and Michigan Canal and its right-of-way between Joliet and connection with the Chicago River. The vote was yes, 808,718; no, 417,039. The proposal was not carried because of the constitutional requirement that a majority of all persons voting at the election must vote in the affirmative for the proposed amendment.

The Illinois Waterway Act makes no provisions for terminals to meet the needs of anticipated water transportation development.

The I. & M. canal lands proposed to be leased, comprising the bed of the old canal and a 90-foot strip on each side thereof and extending from Ashland Avenue in Chicago to Lockport, are no longer needed for canal purposes, but could be made to serve the needs of navigation by capitalizing the rent received under any leases made and applying such capital to the construction or development of public terminal facilities for water-borne commerce.

The rights of the people of the State were carefully safeguarded by the express terms of the Act they were asked to ratify by their ballots, which in part provides as follows:

Section 1. The Department of Purchases and Construction of the State of Illinois be and said department is hereby authorized by and with the consent and approval of the Governor of the State to lease and utilize all or any portion of said Illinois and Michigan Canal and its right of way which, in the opinion of the Director of the department, is no longer required for the purpose of navigation or public water terminals between the city of Joliet in the county of Will and the Chicago River in the county of Cook, in the State of Illinois, upon the following specific terms and conditions:

1. Preference shall be given to leasing for the development of water terminal facilities and the interchange of freight between rail and water or water and rail for public use.

2. Leases shall not be made for a period exceeding ninety-nine (99) years and all leases made shall be subject to a revaluation of the property every ten (10) years.

3. The rental to be received by the State shall be a net return of not less than six (6) per cent per annum upon the valuation of said Illinois and Michigan Canal and its right of way, or any portion thereof, that may be leased, the lessee to pay any taxes, if any, lawfully assessed against such property.

ENGINEERING REPORT.

By M. G. BARNES, *Chief Engineer.*

THE ILLINOIS WATERWAY.

The fiscal year ending June 30, 1927 was not a very favorable year for construction on "The Illinois Waterway." Heavy rains occurred in the fall of 1926, beginning the latter part of August. During the winter and early spring of 1927, additional heavy rains again resulted in flood conditions along the Illinois River. At times the water was so high in the river adjacent to Starved Rock lock and dam that the contractor for this job was prevented from doing any construction work, and in fact, the Chicago, Ottawa & Peoria Railroad, which serves this project, was under water and unable to function. The highways leading to the site of this construction were also inundated and impassable. These conditions made it impracticable for the contractor to make the progress in construction called for by the contract.

Before the end of the fiscal year these high waters had subsided and the contractor, Woods Brothers Construction Company, was able to resume active operations. Preparations were made for night and day work, which will be prosecuted actively until the contractor has made up for lost time occasioned by the floods. Although the work at Starved Rock has been somewhat delayed by the unfavorable weather conditions, it is probable the State will not suffer any serious inconvenience therefrom. At the end of the fiscal year the work was about 35 per cent completed, whereas the prescribed rate of progress called for 75 per cent completion.

The construction work at Lockport is outside of the river channel and not influenced by flood conditions. Contractors on that project made much better progress than could have been made had the work been affected by floods. At the end of the fiscal year, the work of building the lock walls under contract with Green & Sons Company was 98 per cent complete, whereas the prescribed rate called for 100 per cent completion.

LOCK GATES CONTRACT AWARDED.

During the fiscal year the contract for the lock gates for Lockport and Marseilles has been let to the Independent Bridge Company of Pittsburgh, Pennsylvania, and the fabrication of the steel is progressing satisfactorily. This work should be entirely completed during the next

ILLINOIS WATERWAY.

CONTRACT NO. 6—CANVASS OF BIDS RECEIVED OCTOBER 26, 1926.

Item number.	Item.	Unit.	Quantities.	Thos. LeRoy Warner, 111 N. Dearborn St., Chicago, Ill.		H. E. Culhertson Co., 1577 Union Trust Bldg., Cleveland, Ohio.		Henry W. Horst Co., Rock Island, Ill.		M. E. White & Co., 1735 Fullerton Ave., Chicago, Ill.		T. J. Forsehner Con- struction Co., 3153 Bryn Mawr Ave., Chicago, Ill.		Great Lakes Dredge & Dock Co., 104 S. Michigan Ave., Chicago, Ill.		Average of all bids received.	
				Price.	Amount.	Price.	Amount.	Price.	Amount.	Price.	Amount.	Price.	Amount.	Price.	Amount.	Price.	Amount.
A	Clearing.....	Lump sum	1	\$ 3,000 00	\$ 3,000 00	\$ 21,500 00	\$ 21,300 00	\$ 11,000 00	\$ 11,000 00	\$ 23,000 00	\$ 23,000 00	\$ 10,000 00	\$ 10,000 00	\$ 3,460 00	\$ 3,450 00	\$ 11,958 333	\$ 11,958 333
B	Cofferdams, pumping, etc.....	Lump sum	1	40,000 00	40,000 00	120,000 00	120,000 00	190,000 00	190,000 00	161,000 00	161,000 00	125,000 00	125,000 00	90,577 00	90,577 00	121,096 167	121,096 167
C	Excavation.....	Cu. yd.	202,000	1 50	303,000 00	2 40	484,800 00	2 35	474,700 00	2 40	484,800 00	3 00	606,000 00	3 88	783,760 00	2 588	522,843 333
D	Channeling.....	Sq. ft.	10,000	1 60	15,000 00	1 50	15,000 00	1 35	13,500 00	2 95	9,500 00	1 00	10,000 00	95	9,500 00	1 208	12,083 333
E	Pine and fir timber.....	1,000 ft. B. M.	15	100 00	1,500 00	100 00	1,500 00	104 00	1,560 00	125 00	1,875 00	200 00	3,000 00	129 00	1,935 00	126 333	1,895 00
F	Structural Steel.....	Pound.	16,000	10	1,600 00	10	1,600 00	12	1,820 00	10	1,600 00	14	2,240 00	14	2,240 00	117	1,866 667
G	Gray iron castings.....	Pound.	20,000	10	2,000 00	10	2,000 00	15	3,000 00	10	2,000 00	16	3,200 00	15	3,000 00	127	2,533 333
H	Cast iron pipe and specials.....	Pound.	2,060,000	5 1	113,300 00	05	103,000 00	06 1/2	133,900 00	08 1/2	175,100 00	09	185,400 00	06	123,600 00	067	139,050 00
I	Concrete.....	Cu. yd.	160,000	8 50	1,360,000 00	6 85	1,096,000 00	6 75	1,080,000 00	8 15	1,304,000 00	9 00	1,440,000 00	9 80	1,568,000 00	8 175	1,308,000 00
J	Metal reinforcement.....	Pound.	11,500	10	1,150 00	08	920 00	07	805 00	07	805 00	08	920 00	08	920 00	080	920 00
K	36" vitrified pipe and specials.....	Linear foot.	130	8 00	1,040 00	15 00	1,950 00	11 00	1,430 00	10 00	1,300 00	15 00	1,950 00	16 70	2,171 00	12 617	1,640 167
L	30" vitrified pipe and specials.....	Linear foot.	700	6 00	4,200 00	12 00	8,400 00	8 00	5,600 00	7 50	5,250 00	10 00	7,000 00	13 20	9,240 00	9 450	6,615 00
M	24" vitrified pipe and specials.....	Linear foot.	40	5 00	200 00	10 00	400 00	7 00	280 00	4 50	180 00	6 00	240 00	6 25	250 00	6 458	258 333
N	20" vitrified pipe and specials.....	Linear foot.	180	3 00	540 00	7 00	1,260 00	5 00	900 00	3 50	630 00	4 50	810 00	4 20	756 00	4 633	816 00
O	18" vitrified pipe and specials.....	Linear foot.	150	2 00	300 00	5 00	750 00	4 50	675 00	3 00	450 00	4 00	600 00	3 50	525 00	3 667	550 00
P	15" vitrified pipe and specials.....	Linear foot.	80	1 60	120 00	4 00	320 00	4 00	320 00	2 00	160 00	3 00	240 00	2 00	160 00	2 750	220 00
Q	12" vitrified pipe and specials.....	Linear foot.	1,000	90	900 00	3 00	3,000 00	2 50	2,500 00	1 50	1,500 00	2 00	2,000 00	1 60	1,500 00	1 900	1,900 00
R	8" vitrified pipe and specials.....	Linear foot.	100	70	70 00	2 00	200 00	2 00	200 00	1 00	100 00	1 25	125 00	85	85 00	1 300	130 00
S	6" vitrified pipe and specials.....	Linear foot.	2,800	50	1,400 00	1 00	2,800 00	1 25	3,600 00	75	2,100 00	1 00	2,800 00	56	1,568 00	843	2,361 333
T	Pipe railing.....	Pound.	400	25	100 00	50	200 00	75	300 00	60	240 00	40	160 00	30	120 00	467	186 667
U	Excavation in public utilities tunnel and shaft.....	Cu. yd.	2,250	9 00	20,250 00	25 00	56,250 00	19 00	42,750 00	25 00	56,250 00	25 00	56,250 00	8 36	18,810 00	18 560	41,780 00
V	Concrete in public utilities tunnel and shaft.....	Cu. yd.	700	20 00	14,000 00	25 00	17,500 00	30 00	21,000 00	22 50	15,750 00	30 00	21,000 00	10 50	7,350 00	23 000	16,100 00
W	Dry stone packing in public utilities tunnel and shaft.....	Cu. yd.	150	5 00	750 00	10 00	1,500 00	8 00	1,200 00	6 00	900 00	8 00	1,200 00	5 56	834 00	7 093	1,064 00
X	Ventilating blower and motor in public utilities tunnel.....	Each.....	1	500 00	500 00	1,000 00	1,000 00	1,100 00	1,100 00	500 00	500 00	1,500 00	1,500 00	500 00	500 00	850 00	850 00
Y	Pump motor and extension shaft in public utilities tunnel.....	Each.....	1	500 00	500 00	1,500 00	1,500 00	1,900 00	1,900 00	1,800 00	1,800 00	1,500 00	1,500 00	2,200 00	2,200 00	1,566 667	1,566 667
Z	14" iron body bronze mounted gate valve in public utilities tunnel.....	Each.....	4	500 00	2,000 00	150 00	600 00	180 00	720 00	200 00	800 00	250 00	1,000 00	195 00	780 00	245 833	983 333
AA*	Restoring pavement.....	Sq. yd.	1,000	4 00	4,000 00	5 00	5,000 00	4 00	4,000 00	4 00	4,000 00	4 00	4,000 00	4 20	4,200 00	4 20	4,200 00
BB	Setting metal work furnished by State.....	Pound.	25,000	03	750 00	05	1,250 00	04	1,000 00	04	1,000 00	10	2,500 00	03 1/2	875 00	049	1,208 333
Total.....					\$1,892,170 00		\$1,950,000 00		\$1,999,760 00		\$2,256,590 00		\$2,490,635 00		\$2,638,906 00		\$2,204,676 83

* See proposal.

fiscal year. This will make it possible to contract for the excavation in the Marseilles canal without endangering the work at Marseilles lock.

The contract covering the construction of the retaining walls through the city of Joliet was again advertised and bids received on October 27, 1926. Canvass of bids on this contract is submitted herewith. All bids were rejected, and the contract has not been again advertised.

ILLINOIS AND MICHIGAN CANAL.

The almost unprecedented rainfall and high water conditions along the canal below Ottawa caused a break in the canal banks which did considerable damage to the canal, but fortunately private property suffered comparatively little damage. This break caused the closing of the canal for the balance of the season while repairs were being made.

Again in June, 1927, a very heavy downpour occurred just below Joliet. This so raised the water in the adjacent creeks and the canal that the south bank of the canal was overtopped and washed out. This break in the canal was repaired by the State's forces, but the canal was out of service for several weeks while repairs were being made.

During this fiscal year a new bridge was constructed over the canal at Columbus Street, Ottawa, under an appropriation made by the Legislature of 1925.

The unusually high water conditions experienced during this fiscal year has shown the necessity of rebuilding and enlarging some of the old culverts along the canal. During this year the Matchtown culvert near Marseilles was removed and replaced by a culvert of larger capacity.

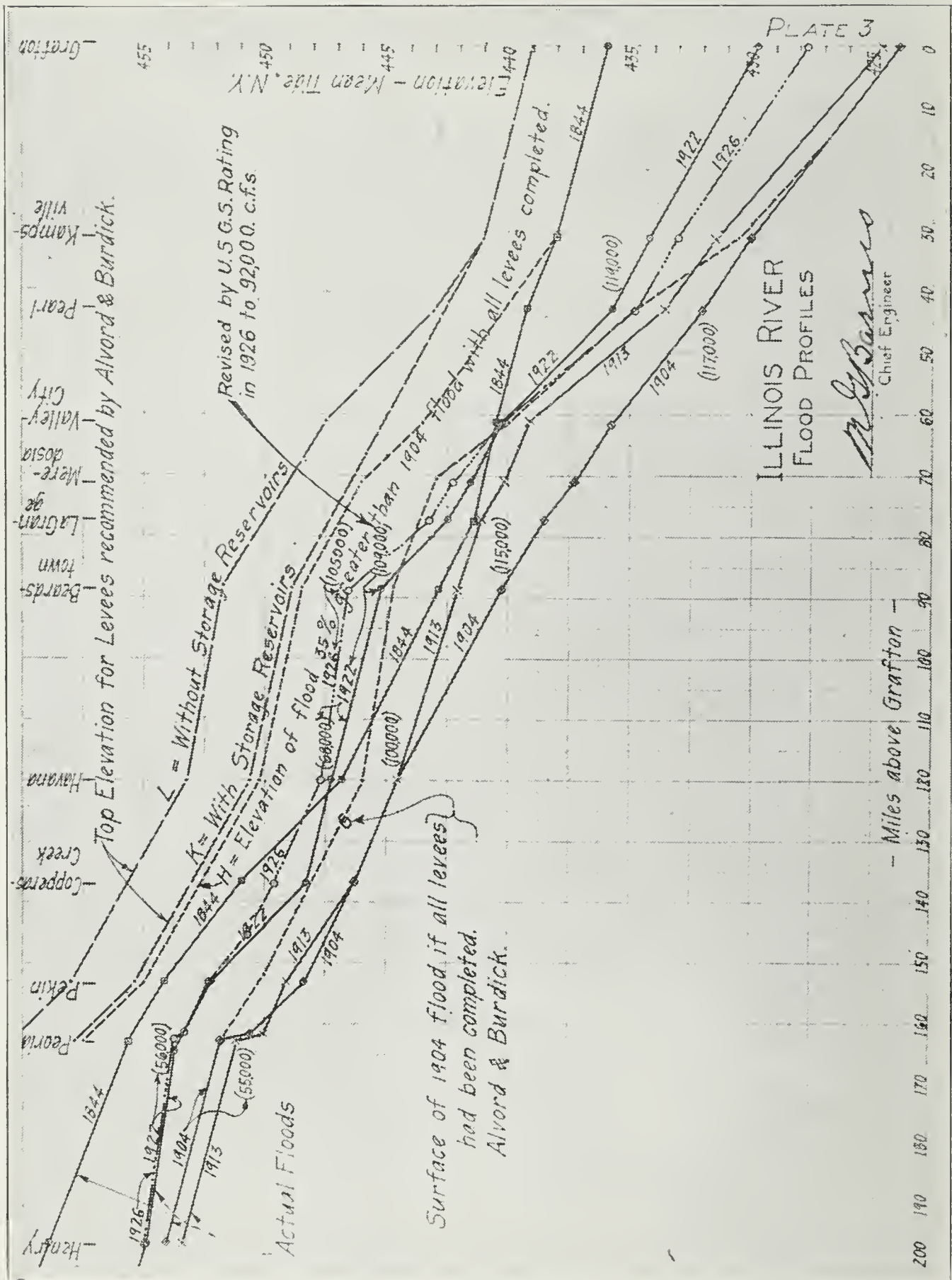
SAND BLASTING AND SPRAY PAINTING OUTFIT.

The sewage laden water passing down the canal is very damaging to all paint used on canal structures. This requires constant attention and frequent repainting of canal structures. In order to accomplish this work in an efficient and economical manner, it has been found necessary to purchase a sand blasting and spray painting outfit to properly remove old paint and resurface the structures. This procedure has been followed during the fiscal year with good success. It will be necessary, however, to diligently follow this method of repair and repainting the surfaces. Tests are being continued of various brands of commercial paints to ascertain, if possible, what brands will best withstand the action of this water. These tests are being made mainly in an effort to find a paint that can safely be adopted for use on the Illinois Waterway structures.

The operation of the canal is given in more detail by Mr. John A. Walter, Auditor and Collector.

MC HENRY LOCK AND DAM.

Pursuant to an act of the General Assembly, approved June 21, 1923, the State acquired the old lock and dam located in the Fox River about two miles below the village of McHenry. This structure was



built by private funds. The action of high water and elements had seriously damaged the dam and portions of the lock. These damages were so extensive that we were unable to maintain the pool level above the dam. The Legislature of 1927 made an appropriation of \$10,000 for the repair of these structures and for operation. The contracts were prepared for rebuilding or repairing damaged portions. The contract for that work will be let within thirty days and should be completed before the low water period of 1928. With the completion of these repairs it will be possible to safely maintain the water level approximately one foot above the level previously maintained.

FLOODS.

As indicated above, the Illinois Valley was visited during the past fiscal year with two excessively high flood periods—one in the fall of 1926, and another in the spring of 1927. The flood occurring in the spring of 1927 attained approximately the same elevation in the lower reaches of the river as attained by the flood of 1922, whereas, the flood in the fall of 1926 reached even higher stages than did either the flood of 1922 or the flood of 1927, and this flood occurred while the water in the Mississippi River at Grafton was not excessively high. These floods have caused great damage to property lying along the Illinois and Mississippi rivers. The flood of 1927 occurred at the time of the great flood along the lower Mississippi which devastated vast areas of the lower Mississippi valley and seriously threatened the safety of Cairo, which, in part, lies much below the crest of the flood and the top of the levees protecting the city.

PROFILE OF FLOOD ELEVATIONS.

Accompanying this report is a profile of the flood elevations along the Illinois River as published in the department's report on the flood of 1922, and revised to include the flood of 1926. Your attention is invited to the elevation of the flood waters in the Mississippi River at Grafton at the time these floods occurred along the Illinois. Any treatment the Federal Government or the State of Illinois shall undertake to relieve flood waters along the Illinois River should take into account the importance of lowering the water in the Mississippi River at Grafton.

MISSISSIPPI HIGH-WATER AFFECTS ILLINOIS' STAGES.

The influence of the stage of the water in the Mississippi at high water periods is frequently felt from one hundred to one hundred fifty miles upstream in the Illinois River. The slope or fall in the last one hundred fifty miles of the Illinois River above Grafton at low water periods is only approximately 27 feet. From this it will be readily seen how flood stages in the Mississippi influence flood stages in the Illinois, and how important it is to prevent high water stages in the Mississippi in order to secure proper improvement of flood conditions along the Illinois River.

HIGHER FLOODS PREDICTED IN 1922.

In our flood report of 1922 it was indicated that much higher flood stages would be experienced in the Illinois River valley. The accuracy of the statements made in that report have been borne out by the record of 1926, at which time the flood stage at Beardstown was about 18 inches higher than the flood stage of 1922. The flood of 1926 occurred at a relatively low water period in the Mississippi River.

This office has twice published reports predicting high water stages in the Illinois River. The first report was made for the Rivers and Lakes Commission by Alvord and Burdick in 1914. The second report was published by the Department of Public Works and Buildings, Division of Waterways, following the flood of 1922. These reports and the charts accompanying them should be studied by the people interested and affected. Experience with these floods since the dates of the reports above referred to, justify the predictions made in those reports, and unless some flood prevention methods are put into effect, still higher flood stages can safely be predicted.

CONCLUSIONS FROM 1922 FLOOD REPORT.

It seems that the public interest is sufficient to reprint the following conclusions reached in the flood report of 1922:

1. The 1922 flood must be expected to recur probably once in ten years.
2. Greater floods must be expected at longer intervals.
3. Water in the Mississippi River at Grafton was relatively low and had the water at that point been as high as at the time of the 1844 flood, the water at Beardstown would have been materially higher and greater damage would have been done to levee districts along the lower Illinois River.
4. The quantity of water discharged at the peak of the 1922 flood was no greater than during the 1904 flood.
5. The increased stage elevations of the 1922 flood over previous floods were due to (a) the construction of levees along the Illinois River which restricted the discharge capacity of the stream and eliminated natural reservoirs, (b) reclamation and drainage of tributary streams permitting greater quantities of water to reach the river in a given period of time, (c) straightening and draining of the Kankakee River at Indiana, (d) addition of approximately 8,000 cubic feet per second of water from another water shed, the Great Lakes, (e) silt brought to the Illinois River valley from tributary streams due to higher velocities created by river improvement.
6. Greater flood elevations must be expected in the future as additional lands are reclaimed and greater restriction is placed on the discharge capacity of the stream.
7. The failure of levee districts at or near the peak of the flood prevented greater damage to other property.
8. The straightening and deepening of tributary streams increases the velocity of water, especially at flood times and causes excessive erosion of banks and beds, which material is carried to lower reaches of the streams and forms thick deposits over the flood plains. This is especially noted in the lower reaches of the Sangamon River and this condition will be aggravated as reclamation of land upstream progresses.
9. Flood heights can be lessened by (a) moving levees back further from the river banks, (b) removing islands from the channel of the stream, (c) clearing islands and shore lines of timber and underbrush, (d) using some of the present levee districts and constructing others for use as reservoirs to be filled when floods reach the danger line, (e) construction of reservoirs on tributary streams.

ANNUAL REPORT OF WALTER M. SMITH, CHIEF DESIGNING ENGINEER,
JULY 1, 1926 TO JUNE 30, 1927.

The Designing Department during the year has consisted of:
One Chief Designing Engineer.
Five Assistant Engineers.
Two Draftsmen.

THE ILLINOIS WATERWAY.

LOCKPORT LOCK, CONTRACT NO. 4.

The concrete work was finished except for a small portion of the floor of the lower miter gates, which was left out to facilitate pumping during erection of gates. The steel work included in Contract 4 was completed and the lift gates tested and found to be satisfactory.

The cofferdams at the upper and lower ends of the lock were left intact to be used during erection of the miter gates.

About all that remains to be done on this contract is the removal of the cableway beams and placing the material in the bank along the east side of the lock, and the construction of a footbridge across Deep Run.

BRANDON ROAD POOL, CONTRACT NO. 6.

The survey for the location of the river wall under this contract was completed and the faces of the walls staked out. The contract was advertised a second time but all bids were rejected again.

BRANDON ROAD LOCK AND DAM, CONTRACT NO. 5.

It was decided to include the miter gates and all other steel work except operating machinery in this contract and the necessary drawings were made. The specifications were partly rewritten to include this but were not finished. The set of drawings was not quite completed.

DRESDEN ISLAND LOCK AND DAM, CONTRACT NO. 3.

It was decided to include the miter gates, taintor gates, ice chute gate, head gates and operating bridge, and all other steel work except operating machinery in this contract. This necessitated several additional drawings and a rewriting of the specifications. This additional work was just begun.

MARSEILLES DAM.

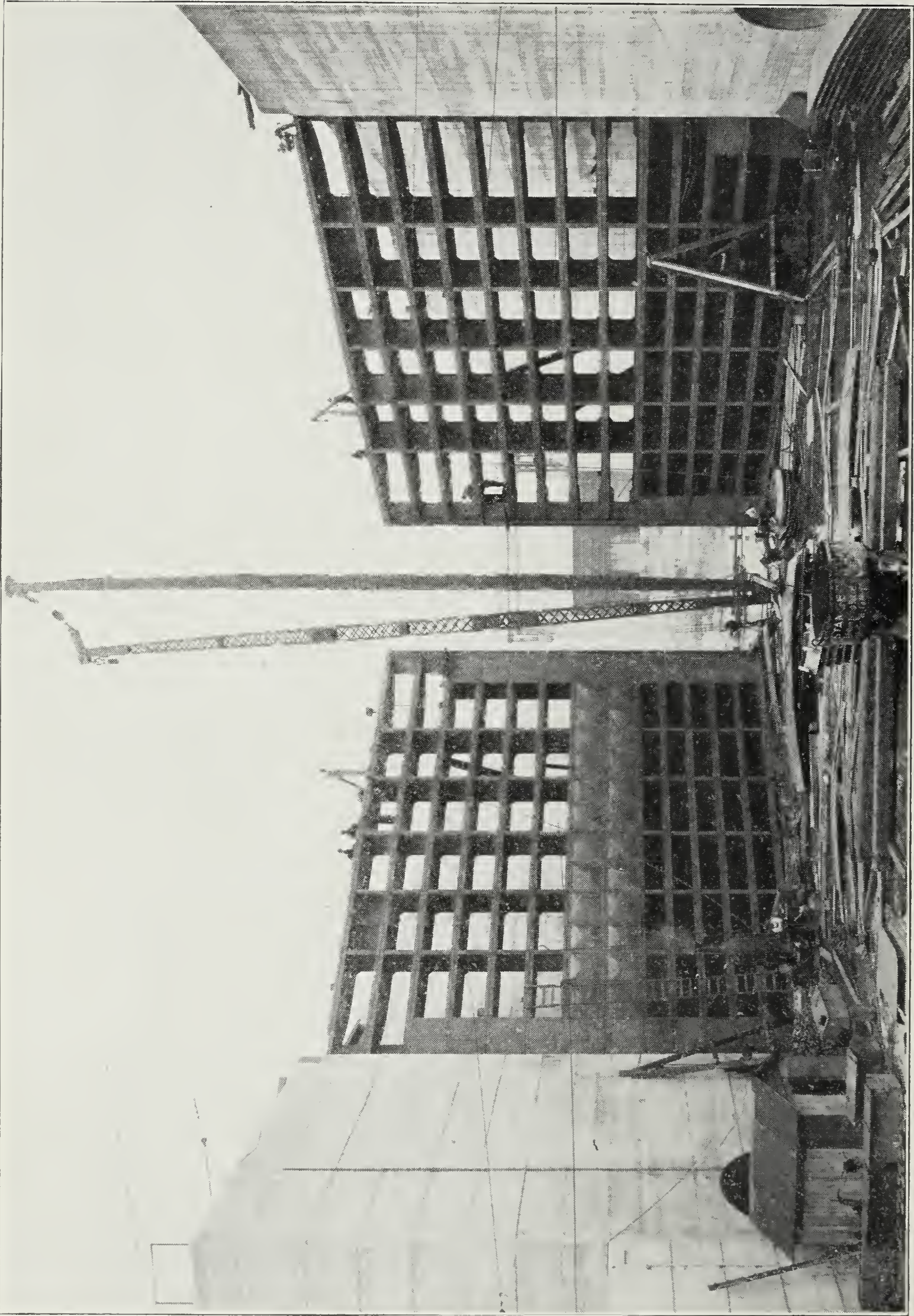
No work was done during the year.

MARSEILLES CANAL.

No work was done during the year.

MARSEILLES LOCK.

A careful survey of the lock was made to determine the exact location of the top of the reaction bearings. These were found to be slightly out of position but apparently not sufficiently so to cause great difficulty in adjusting the quoin bearing pieces.



Miter lock gate construction at Lockport, June 20, 1927. These gates are 55 feet wide, nearly 65 feet high, and weight 315 tons each. They will be operated by electricity, and are the highest gates of this type in the world.

STARVED ROCK LOCK AND DAM, CONTRACT NO. 2.

Work was continued on this contract on the lock and headgate structure. The steel work has all been fabricated and delivered at the site. Considerable delay has been caused by high water in the river.

LOCK GATES AND ANCHORAGES, CONTRACT NO. 4D.

Work was started on the fabrication of the gates for this contract early in the year and erection of the Lockport gates started about the middle of April.

The inspection and testing of materials was done by the Designing Department, which also maintained a general supervision of inspection of fabrication. Considerable difficulty was experienced in fitting parts together due to the fact that there were several different firms engaged in the manufacture of the various members that had to be fitted together. There also seemed to be a lack of cooperation between the different firms engaged in the work.

ILLINOIS AND MICHIGAN CANAL.

OTTAWA AND LASALLE AQUEDUCTS.

A combination sandblasting, air compressing and paint spraying outfit was purchased for general use. Some portions of the Ottawa Aqueduct were cleaned and painted in the spring but it became necessary to suspend the work so that the canal could be thrown open to traffic.

AUX SABLE AQUEDUCT.

In June, 1927, a break occurred in the Aux Sable Aqueduct due to flood conditions. A portion of the floor was carried away. On careful inspection several floor beams were found to be broken at various places in the aqueduct and the whole structure was found to be so badly decayed that it was decided to put in temporary repairs and recommend that a steel aqueduct similar to the one at Ottawa be built as soon as possible.

BREAKS IN CANAL BANKS.

In September, 1926, a break occurred in the south bank of the canal between locks Nos. 11 and 12 at the same place that break occurred two years before. It was realized that if this break were closed without a spillway being constructed somewhere in this level of the canal it will only be a matter of a short time before another break will occur as this pool is only about one mile long and two streams enter it from the north side. Therefore, when the break was repaired a spillway was constructed alongside lock No. 12.

In June, 1927, another break occurred in the south bank of the canal about two miles below Joliet. This break was filled by hauling material from nearby and dumping it into that gap.

COLUMBUS STREET BRIDGE, OTTAWA.

Plans for this bridge were completed and the contract let to the Milwaukee Bridge Company of Milwaukee, Wisconsin. During construction it was found that the concrete of the abutments and pier was in much worse condition than supposed and, therefore, a great deal more

concrete had to be built than it was thought would be necessary when the estimate of cost was made. This increased the cost of the bridge to considerably more than estimated. At the end of the year the bridge was complete except for the installing of the end lift and latch machinery.

CLARKE'S RUN CULVERT, UTICA.

A design in sufficient detail for an estimate of cost was made for a culvert at this place.

MATCHTOWN CULVERT, MARSEILLES.

Modifications were made in the design of this culvert some time ago and it was constructed utilizing the old foundation.

MISCELLANEOUS.

BEARDSTOWN FLOOD PROTECTION.

Drawings and specifications were prepared for retaining walls and levees to protect Beardstown from flood waters, and the contract was awarded and is now in process of construction.

CHANGE IN OFFICE.

In June, 1927, the office of the Division of Waterways was moved from Room 950, 608 South Dearborn Street to Room 1510, 220 South State Street.

PERMITS ISSUED.

ANNUAL REPORT OF W. G. POTTER, DRAINAGE ENGINEER.

During the year from July 1st, 1926 to June 30th, 1927, inclusive, the following permits were issued by this division:

FORMAL PERMITS.

Docks, piers, retaining walls, etc.....	57
Sewer system or treatment plant.....	39
Tunnels, pipe lines and transmission lines crossing streams.....	40
Dredging and filling.....	14
Bridges	43
Chicago River change of channel.....	1
Harbors, water intakes and discharges.....	11
Dams	4
Drainage Districts	3
<hr/>	
Total formal permits.....	212
Letter permits, piers, channels, etc., for Fox Lake Region.....	25
Bridges and Culverts on weekly list from Division of Highways.....	461
<hr/>	
Total number of permits issued.....	698

EXCESSIVE RAINS IN ILLINOIS VALLEY

August 29 to October 5, 1926.

By W. G. POTTER.

Excessive rains in the fall of the year are rather unusual in Illinois. For that reason a short description of the rainfall of August to October, 1926, is worthy of record.

Including the 38 days from August 29th to October 5th, 1926, the rainfall over the central part of Illinois far exceeded any past record. Therefore, the writer has made a study of the extent and amount of precipitation during that period.

OFFICIAL RECORD CONSULTED.

The figures here given for rainfall are taken from the U. S. Weather Bulletin, and also partly from the excellent paper of Mr. Clarence J. Root, Meteorologist of the U. S. Weather Bureau at Springfield, Illinois, as read before the Illinois Society of Engineers.

The early part of August, 1926, was wet, the rainfall considerably exceeding the normal. The ground was pretty well saturated and the harvesting of grain was much delayed. Towards the end of the month, beginning on August 29th and ending on September 5th, occurred a general rain of great intensity. Rain to the depth of 3 to 6 inches in 24 hours fell in many places.

Again on the 8th and 9th, rains approaching deluge intensity covered the central belt of the State. At Griggsville 6.06 inches fell in 13¼ hours; at Alexander 7.02 inches and at Charleston 8 inches in 24 hours. At Springfield 3 inches fell in 2 hours with a total in the 6 day period from September 3rd to 8th of 10.83 inches. This is the record for Springfield and has only been exceeded twice on the record of an entire month.

RAINFALL ON ILLINOIS RIVER WATERSHED AUGUST 29 TO OCTOBER 5, 1926.

Station.	River.	Rainfall inches.	Normal annual.	Per cent of annual.	Per cent for river.
Joliet	DesPlaines	7.68	32.08	23.9	23.9
Aurora	Fox	8.73	34.79	25.1	
Elgin	do	9.80	30.14	32.5	28.8
Kankakee	Kankakee	12.37	32.07	38.6	38.6
Pontiac	Vermilion	13.50	31.22	43.2	43.2
Ottawa	Illinois	15.22	33.42	45.5	
Tiskilwa	do	11.10	35.68	31.1	
Walnut	do	14.59	33.10	44.1	
Fairview	do	15.07	30.72	49.1	
Grafton	do	13.51	37.18	36.3	
Griggsville	do	21.91	35.86	61.1	
Havana	do	12.36	34.10	36.2	
Whitehall	do	20.21	36.64	55.2	
Peoria	do	16.53	36.29	45.5	
Pearl	do	22.17	37.79	58.7	
Minonk	do	14.86	31.24	47.6	
LaSalle	do	13.18	31.41	42.0	
Henry	do	13.40	33.26	40.3	
Astoria	do	11.94	35.15	33.9	
Beardstown	do	14.87	34.01	43.7	
Ottawa	do	15.22	33.42	45.5	
Dwight	do	12.58	32.79	38.4	
Morris	do	10.67	29.24	36.5	43.9
LaHarpe	Crooked Creek	12.10	36.21	33.4	
Macomb	do	12.34	33.84	36.5	
Rushville	do	15.12	34.01	44.5	38.1
Clinton	Salt Creek	22.48	36.90	60.9	
Lincoln	do	16.95	34.49	49.1	
Bloomington	do	17.65	36.07	48.9	53.0
Decatur	Sangamon	23.32	35.40	65.9	
Springfield	do	20.52	36.96	55.5	60.7
All stations	Illinois watershed	14.92	34.05	43.8	43.8

herewith. This chart shows the total rain on each main tributary and on the entire Illinois valley; the normal annual rainfall and the percentage of that normal which fell during this period.

Noticeable in the chart is the fact that the rain over the upper tributaries was comparatively light, and that it increased towards the south until on the Sangamon 60.7 per cent of the normal annual fell during the 38 day period. The entire Illinois Valley, by averaging the 31 stations, showed 43.8 per cent of the normal annual.

In consequence of these unprecedented rains, rivers all through Central Illinois were at flood stages, and great damage was general. Several dams burst, adding the reservoir waters and increasing the damage. One railroad, in a distance of 140 miles, had 16 bridges washed out or damaged and three heavy track washouts.

While this flooded condition was general, the greatest damage was sustained along the Illinois River and its tributaries. For that reason this report is devoted to the Illinois River watershed alone.

THE ILLINOIS RIVER WATERSHED.

The Illinois River is formed by the junction of the Fox, Des-Plaines and Kankakee rivers in the northeastern part of the State. Its course is generally southwest, and it enters the Mississippi about 40 miles above St. Louis. Tributary streams, mostly draining the central belt of the State, are the Spoon, Mackinaw, Crooked Creek and Sangamon.

The great physical characteristic of the Illinois is the abrupt change near LaSalle from a stream of very rapid descent, largely through rocky bottom, to a sluggish one with but little fall. On the lower 200 miles of its course, the stream winds back and forth with many twists and bends.

DRAINAGE DISTRICTS EMBRACE 1,550,000 ACRES.

The Illinois Valley varies from two to ten miles in width and was originally largely covered by lakes and swamps. Much of this low ground, which is very rich and fertile, has been reclaimed by building levees along the river and pumping out the impounded water. On the main river 69 drainage districts have been organized, reclaiming some 320,000 acres, and about ten other districts are in process of organization. On the various tributaries some 350 districts have been organized. The total area on the Illinois and its tributaries now in drainage districts is about 1,550,000 acres, the average per district being about 4,440 acres.

In consequence of this long period of excessive rain, 23 districts on the Illinois alone were inundated either by the levees being overtopped or broken. About 100,000 acres were flooded in these districts and many more which were in cultivation, but not in districts.

The principal crops, being corn and small grains, and being either mature or already harvested but still in the field, were entirely destroyed. The loss in the Illinois valley alone was estimated at \$2,700,000; for damage to crops below the high water line. This does not include damage to buildings in farm or city, nor does it include damage incurred above the actual flood line.

CALAMITY NOT CONFINED TO FARMS.

Turning from farm to city property, the greatest damage was done in the city of Beardstown. This is a city of about 7,000 population located mostly on low ground on the banks of the Illinois. Low water on the river is normally about at an 8-foot stage on the gauge. At the crest of the 1922 flood, the gauge showed 25.1 and in 1926 the flood now being considered, the water rose to 26.6, the highest on record. About nine-tenths of the town was under water, some of it up to 10 feet or more. The town was completely surrounded by water. No actual money value has been or could accurately be put on the damage sustained in this town. Other towns partly inundated and subjected to heavy damage were Liverpool, Havana, Bath, Frederick, Naples and Valley City.

In consequence of this flood many of the districts are still partly under water and will be unable to raise crops this coming season. Several districts, having gone through both the 1922 flood and the 1926 flood, are unable to tax the property high enough to make repairs, and many farms will be lost to their owners because of their inability to make payments due for taxes on land.

ILLINOIS AND MICHIGAN CANAL REPORT.

By JOHN A. WALTER, *Auditor.*

SUMMARY SPECIAL CANAL FUND

and

Activity Report July 1, 1926, to June 30, 1927.

Balance on hand July 1, 1926.....	\$56,644.12
Expenditures July 1, 1926, to June 30, 1927.....	\$39,162.96
Receipts July 1, 1926, to June 30, 1927.....	35,788.51
	<hr/>
Expenditures over receipts.....	3,374.45
	<hr/>
Balance on hand July 1, 1927.....	\$53,269.67

RECEIPTS.

July 1, 1926, to June 30, 1927.

90 foot strip, lots and bridge rentals.....	\$16,044.83
Water power rentals.....	12,492.24
Boat house rentals.....	35.00
Water pipe rentals and miscellaneous.....	6,266.91
Ice leases.....	795.00
Certified copies	20.00
Tolls and lockages.....	134.53
	<hr/>
Total	\$35,788.51

EXPENDITURES.

July 1, 1926, to June 30, 1927.

Appropriation for Illinois and Michigan Canal.....	\$39,162.96
Appropriation for Illinois River.....	25,794.98
Appropriation for Bridge at Columbus Street, Ottawa.....	25,000.00
Appropriation for Culverts at Marseilles, Illinois.....	18,128.45

ILLINOIS AND MICHIGAN CANAL EXPENDITURES.

July 1, 1926, to June 30, 1927.

Salary locktenders and officers.....	\$ 8,820.00
Labor pay rolls.....	14,914.45
Repairing gap in banks west of Lock 11.....	6,116.16
Repairs	362.56
Maintenance and operation.....	3,564.79
Equipment	29.15
Two new spillways at Lock 12.....	5,355.85
Total expenditures	\$39,162.96

MAINTENANCE NAVIGATION ILLINOIS RIVER EXPENDITURES.

July 1, 1926, to June 30, 1927.

Salary locktenders, collectors and inspectors.....	\$ 5,300.00
Labor pay rolls.....	7,799.95
Repairs	2,963.80
Maintenance and operation.....	4,386.39
Dredging at Bell's Landing.....	1,000.00
Dredging at Copperas Creek Lock.....	802.79
Equipment	3,542.05
Total expenditures	\$25,794.98

Number of boats running, tolls and lockage collected, and tons transported on the Illinois and Michigan Canal and through Henry and Copperas Creek Locks for period July 1, 1926, to June 30, 1927

	Copperas Creek	Henry	Joliet	LaSalle	Total
Tolls and lockages.....	\$13.82		\$87.34	\$33.37	\$134.53
Boats cleared	7		38	13	58
Tons transported	662				662

Statement of the principal articles transported upon the Illinois River, cleared at Collector's office at Locks, at Henry and Copperas Creek, for the year ending June 30, 1927.

Articles	Measure	Copperas Creek	Henry	Total
Wheat	bushels	8,000		8,000

ACTIVITY REPORT.

July 1, 1926, to June 30, 1927.

Decreased receipts due to reduction in tolls and lockages caused by flood damages which prevented navigation on the canal, and high water in the Illinois River so that traffic boats did not use the river locks but passed over the dams at Henry and Copperas Creek locks, also there was received the previous year \$4,750.00 as part payment on spillway dam at Pecumsasgen.

Expenditures increased \$10,838.62 over previous year due to permanent improvements and repair of flood damages. There has been constructed two new concrete spillways one east and one west of Lock 12 in LaSalle County at cost of \$5,355.85. On September 23, 1926 excessive rain falls and floods caused a break in the towpath west of Lock 11 which cost \$6,116.16 to repair, and east of Lock 12 for a distance of three hundred feet the channel was filled with tile, brick and debris and at Higby Canyon a sand bar seven hundred fifty feet long formed in the channel, these fills were removed by the State dredge outfit.

On June 4, 1927 there was an unusual rain fall, Rock Run and all other creeks that empty into the canal were out of their banks, the canal not able to take care of the large amount of water and the banks overflowed near Bush Bridge, which caused a break in the towpath sixty-five feet long, sixteen feet deep and which will take until last of July to repair, the same floods washed out twenty feet of the flooring on west end of Aux Sable aqueduct which was promptly repaired by our regular crew.

Up to date of this report (June 30, 1927) navigation has not yet been opened due to construction of a new culvert across canal at Matchtown, sand blasting and painting of aqueduct over the Fox River at Ottawa, and bars in the channel west of Ottawa.

Thirteen new leases for strips of canal reserve and two pole line leases were made, and nine certified copies of land and lot sale books furnished. Canal reserve and Feeder reserve in sections 30, 31 and 36 leased and lease contained the usual cancellation clause. One boat house lease cancelled and structure removed. Rental on two houses at Levee Street were increased.

Permits issued to Public Service Company for transmission line across canal at Van Buren Street, Joliet; Telephone Company for conduit at LaSalle Street, Ottawa; and Ottawa Silica Company to extend their dyke along canal west of Lock 11; sewer and bridge across canal at Forty-eighth and Cicero Avenues.

Illinois Bell Telephone Company removed part of their poles in LaSalle County that were on canal reserve and recount has been made of remaining poles.

Locktenders' telephones in LaSalle County were transferred to local exchanges thereby making a saving in toll charges.

New bridge across canal at Columbus Street, Ottawa, and new culvert at Matchtown were constructed.

Seventeen racing boats from Chicago to New Orleans went through the canal from Channahon to Marseilles where they entered the Illinois River.

In September, 1926 the Standard Unit Navigation Company power boat with two loaded barges made trip from LaSalle to Joliet and in November they returned to LaSalle.

Nineteen test plates of steel and paints have been submerged in canal at Jackson Street lock for testing purposes.

Hearings were held at Morris and Ottawa by Court of Claims in connection with flood damage claims of 1924 and 1926.

Sandblasting and paint spray outfit purchased and the interior of Ottawa aqueduct has been sand blasted and painted two coats of red lead.

Waste weir and gates east of Brandon bridge were rebuilt and new snubbing posts installed at all the locks.

The Rock Island Railway reinforced their wall along the canal at Split Rock.

Painted and repaired all the State buildings at Copperas Creek Lock.

Repaired, reinforced and painted lock gates and built up the dyke at Henry Lock.

Up to June 30th this season we have dredged, repaired banks and cleared the channel between Joliet and Lock 11 which is west of Ottawa to permit boats with three feet six inch draft to get through; it will take about twenty more days to clear the channel between Lock 11 and the river at LaSalle. It is the intent to continue dredging, repairing and raising canal banks between LaSalle and Marseilles until October 15th, and then continue same kind of work between Channahon and Joliet.

The United States dredging outfit cleared out the approaches to, and chamber of the lock at Copperas Creek.

A private dredging outfit was used to dredge a channel from the Illinois River to the elevator at Bell's Landing in Fulton County.

PUBLICATIONS FOR DISTRIBUTION BY THE DIVISION OF WATERWAYS.

Issued by the Rivers and Lakes Commission of Illinois 1911-1916.

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BULLETINS.

No. 1 The Conservation of Water Power in the DesPlaines and Illinois Rivers and the Improvement of these Rivers for Navigation—1911.

No. 2 Prospectus of a project for a Deep Waterway and conservation of a natural resources of the State of Illinois, prepared by Lyman E. Cooley—1911.

- No. 3 Uses of the Great Lakes—1912.
- No. 4* Land Drainage in Illinois, by Robert Isham Randolph—1913.
- No. 5 A compilation of money spent by the Government on various Harbors, Rivers and Canals, and the riparian property holders benefited—1912.
- No. 6 Argument on behalf of the State of Illinois supporting the prayer of the Sanitary District of Chicago for a permit to take 10,000 cubic feet of water per second from Lake Michigan, by Isham Randolph—1912.
- No. 7* The 1912 Flood on the Lower Mississippi, by A. L. Dabney, Consulting Engineer, and "The 1912 Flood in the Ohio and Mississippi Rivers," by H. C. Frankenfeld—1912.
- No. 8 Proceedings of the organization meeting of the Association of the Mississippi Valley States for river control—1912.
- No. 9 The Illinois Water Power Waterway—1912.
- No. 10 The Illinois Waterway—A Guide for Navigators from Lake Michigan to the Mississippi River via the Chicago Sanitary and Ship Canal, the Illinois and Michigan Canal and the Illinois River. Also an Alternate Route via the Illinois and Mississippi Canal—1916. (New edition in preparation.)
- No. 11* European Harbor Development, by Robert R. McCormick—1912.
- No. 12* Common Sense applied to the Inland Waterway Problem, by Robert R. McCormick—1912.
- No. 13 The Illinois Waterway, A Review, by Isham Randolph—1912.
- No. 14 Water Resources of Illinois—A cooperative report prepared by Rivers and Lakes Commission and A. H. Horton, District Engineer of the United States Geological Survey—1914.
- No. 15* The Illinois Waterway—A Project for a waterway of eight feet minimum depth between Lockport and Utica and available for immediate construction—1914.
- No. 16 Stream Pollution and Sewage Disposal in Illinois with reference to public Policy and Legislation, by LeRoy K. Sherman—1915.
- No. 17* Report of Survey and investigation of La Moine River, with Reference to Flood Control and Navigation.
- No. 18* Flood Control for Pecatonica River—1916.
- No. 19* Project for a Navigable Waterway from Southern Illinois Coal Fields to Mississippi River—1917.
- No. 20* The Illinois Waterway Report with plans and estimates of cost for a deep waterway from Lockport to Utica by way of the DesPlaines and Illinois Rivers, Internal Improvement Commission—1909.
- No. 21* Surface Water Supply of Illinois, Internal Improvement Commission—1908—1910.
- No. 22 Report and (Plans*) for reclamation of lands subject to overflow in the Kaskaskia River Valley, Illinois—1910—1911. Postage 16 cents.
- No. 23 Report upon the prevention of overflow of the Little Wabash and Skillet Fork Rivers—1911. Postage 16 cents.
- No. 24 The Illinois River and its Bottom Lands, by Alvord and Burdick—1915. 2nd Edition 1919.
- *Map and Profile of Fox River—1915.
- Annual reports of Rivers and Lakes Commission 1912*—1913—1914—1915*—1916.*

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*First annual report—1917-18.

Second, Third, Fourth, Fifth, Sixth, Seventh, Eighth and Ninth Annual Reports 1918-26.

Saline River report 1920 (See Third Annual Report).

* On file in office of Division of Waterways, Chicago. Supply for distribution exhausted.

Inland Waterways and Transportation cost by M. G. Barnes, 1920.

No. 25 Big Muddy River Report 1922—(Also in Fifth annual report).

No. 25½ Floods in Illinois 1922—causes, results and remedies (Also in Fifth Annual Report.)

Pecatonica River report—1924 (See Seventh Annual Report.)

Report of the Interstate Harbor Commission of Illinois and Indiana on Harbor and Terminal Development at the State line between Illinois and Indiana and in Chicago Industrial District—1922.

No. 26 Calumet Lake and Chicago-Nickle Plate Agreement—1926.

No. 27 Laws of Illinois relating to Waterways.

No. 28. National Aspects of Lakes to Gulf Waterway—Diversion of waters from Lake Michigan—Boundary Waters Treaty, etc.

* On file in office of Division of Waterways, Chicago. Supply for distribution exhausted.

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